Steunpunt beleidsrelevant onderzoek 3de generatie

Studie- en Schoolloopbanen

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## A Multinomial Multilevel Approach

M. Smet & B. Janssens

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## A Multinomial Multilevel Approach

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Het debat betreffende de instroom in de lerarenopleiding in Vlaanderen is recentelijk heropgeleefd naar aanleiding van de publicatie van de Beleidsevaluatie Lerarenopleidingen. Het doel van voorliggend rapport is om een meer gedetailleerd beeld te vormen van de instroom in de geïntegreerde lerarenopleiding, meer bepaald in de lerarenopleidingen kleuteronderwijs, lager onderwijs en secundair onderwijs.

Om dit mogelijk te maken werden administratieve data gelinkt van een volledige cohorte studenten die afstudeerde in het secundair onderwijs in 2004-2005. Op deze manier konden studenten die andere onderwijskeuzes maken met elkaar vergeleken worden aan de hand van multilevelanalyses. In een eerste stap werd de instroom van studenten in academische versus professionele programma's vergeleken. Ten tweede werden alle professionele programma's gehercodeerd naar vier clusters, waarvan de instroom vervolgens ook vergeleken werd. Één van deze clusters is de cluster Onderwijs, die bestaat uit de drie geïntegreerde lerarenopleidingen. Ten derde werd de instroom in de drie verschillende professionele lerarenopleidingen met elkaar vergeleken.

De kans op instroom van BSO-studenten in de cluster Onderwijs werd, in overeenstemming met de algemene perceptie, als uitzonderlijk hoog bevonden. Deze hoge BSO-instroom is echter volledig te verklaren door het groot aantal BSO'ers in de lerarenopleiding Kleuteronderwijs: 26% van alle instromers in Kleuteronderwijs is afgestudeerd in BSO. Wat betreft de lerarenopleiding Lager Onderwijs en Secundair Onderwijs waren de bevindingen volledig anders: De BSO-instroom is hier lager dan gemiddeld in vergelijking met de volledige instroom in professionele opleidingen in het hoger onderwijs, terwijl de ASO-instroom hoger dan gemiddeld werd bevonden.

46% van de BSO-instromers in de lerarenopleiding kleuteronderwijs heeft kinderzorg gestudeerd in het laatste jaar secundair onderwijs. Wij stellen ons dan ook de vraag of dit niet zou moeten beschouwd worden als een logische studiekeuze en of deze instroom echt problematisch is.

Er zijn geen significante verschillen gevonden tussen de geïntegreerde lerarenopleidingen en de andere professionele programma's wat betreft het aantal zittenblijvers in het secundair onderwijs. Ook tussen de drie soorten lerarenopleidingen werden geen significante verschillen gevonden wat betreft het aantal zittenblijvers in het secundair. Hoewel het aantal BSO'ers in kleuteronderwijs dus beduidend hoger ligt, zijn dit geen studenten die vaker zijn blijven zitten.

Het vrouwelijke karakter van de professionele lerarenopleiding is ook in dit rapport bevestigd. Dit geldt echter niet voor de geïntegreerde lerarenopleiding secundair onderwijs, waar ongeveer even veel mannen als vrouwen instromen. Het aantal instromers zonder Belgische nationaliteit is beduidend laag in alle professionele lerarenopleidingen.

De multilevelanalyses tonen aan dat de secundaire scholen een rol spelen bij de studiekeuze van scholieren in Vlaanderen. Meer onderzoek is echter noodzakelijk om inzicht te krijgen in het belang van en hoe secundaire scholen een rol kunnen spelen in de studiekeuze van hun studenten.

We willen tot slot benadrukken dat de kwaliteitsperceptie van onze toekomstige leraren niet volledig zou moeten afhangen van de instroomprofielen van de studenten in de lerarenopleiding, maar ook van de kwaliteit van de uitstroom. Als een BSO'er er in slaagt zijn of haar diploma van de lerarenopleiding te halen, is het dan niet logisch dat we deze persoon als een potentieel kwalitatieve leerkracht moeten beschouwen?

# Introduction

In Flanders, the debate on the quality of the inflow in teacher education programmes has recently flared up again after the publication of the report on the policy evaluation of the teacher education programmes (Commissie Beleidsevaluatie Lerarenopleidingen 2013). This policy evaluation was not the first report in Flanders that stimulated the debate on the quality of teacher education programmes (Matheus, Siongers et al. 2004; Huyge, Siongers et al. 2009). However, this debate is not sufficiently informed. Only a limited number of possible determinants of the inflow have been considered, and never before with the use of multivariate analyses. For example, the possible impact of the secondary school context has never been considered in this context. The aim of this report is to gain more in-depth knowledge of the inflow in professional teacher education programmes in Flanders.

To gain more in-depth knowledge in the inflow in professional teacher education programmes, we compare the profiles of students who make different decisions when making the transition from secondary to higher education. We assume the decision making process of students to be stepwise. We suppose the first educational choice a student is confronted with is the choice between an academic or a professional programme. Conditionally on choosing for a professional programme, we break the student's transition options down to four professional 'clusters'. Finally, if a student opts for the professional Education cluster, his third choice consists of three final options: nursery, primary or secondary teacher education. This way, it is possible to compare the differences in profiles of students who make different educational choices and therefore gain more insight into the inflow in the different professional teacher education programmes.

This report fits in with the research on education transitions, which has been expanding since its beginning in the 1980s (Mare 1980). More precisely, this report can be framed into a more recent wave within this tradition of research on education transitions that found its origin in addressing a limitation of the Mare model (Breen and Jonsson 2000; Benito and Alegre 2012). The limitation that is addressed is the implicit assumption that transitions can be considered as yes/no-questions, without taking into account the possibility of parallel branches of study (Mare 1980; Breen and Jonsson 2000; Benito and

Alegre 2012). As Breen and Jonsson (2000) and Lucas (2001) argue, considering different parallel branches of study is relevant when investigating education transitions, since opting for different parallel branches might be influenced by different determinants.

While research in Flanders on the inflow in teacher education programmes has been limited to the consideration of a limited number of determinants, international literature has been examining the influence of a multitude of determinants on the choice of a certain transition option when considering the transition from secondary to higher education. Four main categories of determinants have been distinguished. First, individual characteristics e.g. gender, age, ability and nationality are found to significantly influence the choice of field of study (Ayalon and Yogev 2005; Benito and Alegre 2012). Second, the transition choice is found to be highly influenced by family background characteristics such as type of family, number of siblings, education of the parents and family income (Van de Werfhorst, De Graaf et al. 2001; Nguyen and Taylor 2003; Van de Werfhorst, Sullivan et al. 2003; Ayalon and Yogev 2005). Third, Nguyen and Taylor (2003) and Benito and Alegre (2012) found the impact of certain secondary school characteristics (e.g. percentage of students from families with a low educational level and school type) to have a significant impact on the transition choices after secondary education. However, research on the impact of secondary school characteristics on transition options has been scarce so far (Nguyen and Taylor 2003; Benito and Alegre 2012). The literature on the influence of the school context on a student's educational achievement is more expanded (Leckie 2009; Owens 2010; Rasbash, Leckie et al. 2010; Sykes and Musterd 2011). Finally, regional characteristics such as geographic location have been found to play a part in educational achievement and the transition from secondary to tertiary education For example, higher unemployment levels in the region you live can make you choose for programmes that lead to higher job security. (Nguyen and Taylor 2003; Ayalon and Yogev 2005; Kauppinen 2008). One of the strengths of this report is that not only individual characteristics of the student will be considered. It is hypothesised that the social contexts wherein a student lives influence the educational transition choices she or he makes. We will therefore explicitly take the secondary school and residence context into account when considering the educational choices of a student.

The remainder of this report includes five chapters. The first chapter describes the data and methodology that were used for the analyses. Chapter two to four report on the results of the different analyses. The final chapter presents the implications for policy makers and indicates directions for further research.

# Chapter 1: Data & Methodology

In this report we compare the profiles of students who enroll in different higher education programmes. We compare the inflow in academic versus professional programmes, as well as the inflow in different professional bachelor programme clusters by considering the importance of individual, secondary school and municipality effects. We also compare the inflow in the different professional teacher education programmes, more precisely nursery, primary and secondary teacher education programmes. In this chapter, the data and methodology to make these comparisons possible are clarified.

## 1.1 Data

The data used in this report are subsets of newly linked administrative data provided by the Flemish Department of Education. These data enabled us to consider the transition from secondary to higher education of a population cohort of students who graduated from secondary education in the academic year 2004-2005[1]. This dataset includes information on both student characteristics (e.g. gender, nationality, year of birth, grade retention), detailed individual enrolment information in secondary and higher education, as well as a number of school and regional characteristics.

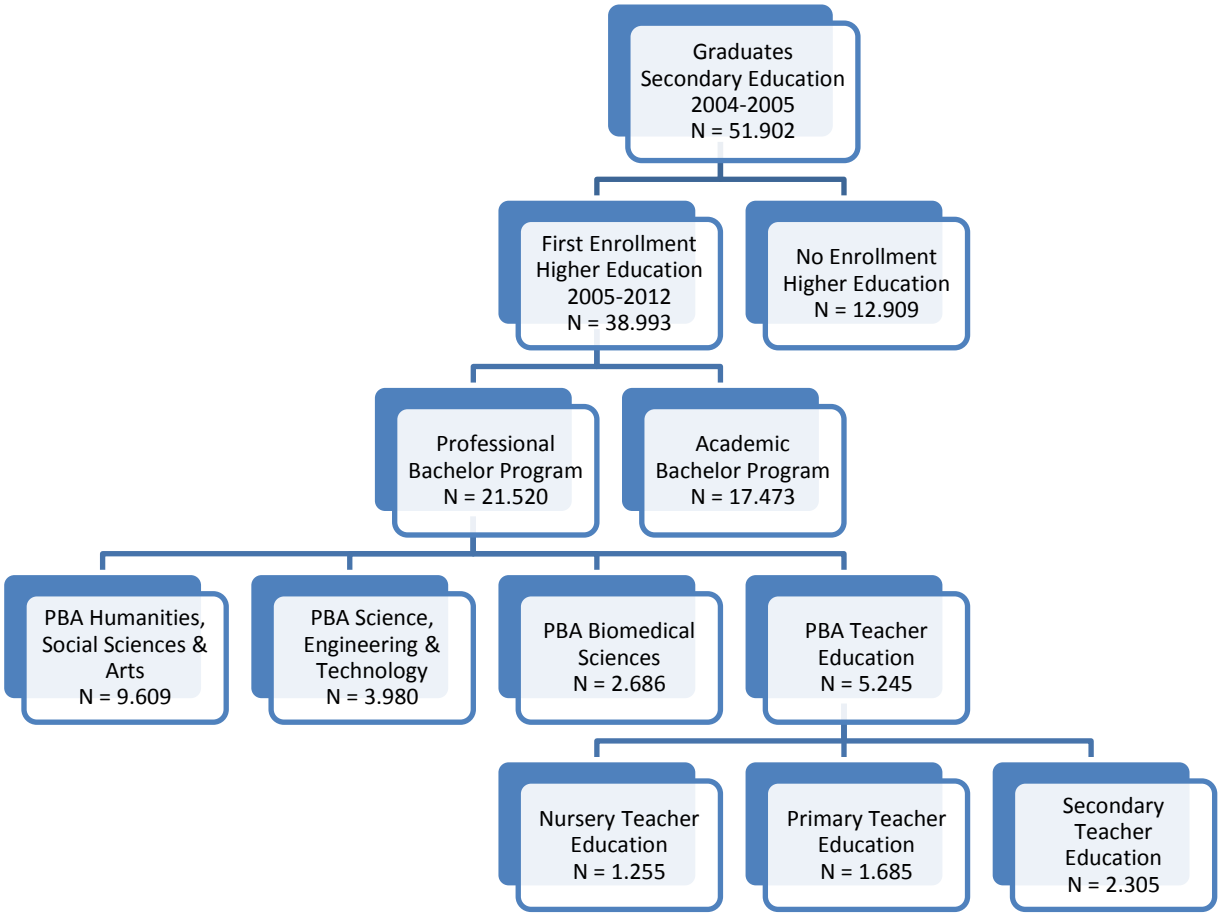
Data on 51.902 pupils who graduated from secondary education in 2004-2005 were linked to higher education data from the period 2005-2012. Based on the time of registration, the first enrollment in higher education was selected for every student. 38.993 of the 51.902 graduates enrolled in higher education during the considered period 2005-2012. Subsequently, those students who enrolled in a professional bachelor programme were selected. Next, these professional bachelor programmes were subdivided[2] into 4 major clusters of field of study: PBA Teacher Education, PBA Humanities, Social Sciences & Arts, PBA Biomedical Sciences and PBA Technology, Engineering & Science. Finally, the professional programme of teacher education is divided into three major

[1] This Is a cohort who enrolled in teacher education programmes before the reformations in these programmes.
We opted for a cohort who graduated in secondary education in 2004-2005 because in a next report we will attempt to explore the entire educational career in higher education of this cohort of students, which is why we needed a sufficiently long time span..

[2] More information on the coding of these clusters can be found in Appendix I

categories: nursery, primary and secondary teacher education programmes. These subdivisions and the number of students are represented in Figure 1.

**Figure 1: Data selection**




While these administrative data can be considered as a rich source of information for research, there is a major drawback that should be mentioned. As mentioned in the introduction of this report, educational choices are highly influenced by family background characteristics such as type of family, number of siblings, education of the parents and family income (Van de Werfhorst, De Graaf et al. 2001; Nguyen and Taylor 2003; Van de Werfhorst, Sullivan et al. 2003; Ayalon and Yogev 2005). However, no such information is available in the provided administrative databases. It should therefore be noted that attention should be paid when interpreting the results of the analyses, as they might be influenced by omitted variable bias: Because family background characteristics are likely to be correlated with variables such as nationality, educational choice and even the school

you go to and the municipality you live in. The estimated effects might therefore be influenced by the omission of these family background characteristics.

## 1.2 Research Design and Methodology

Multinomial logistic multilevel models were used to compare the differences in profiles of students who make different educational transition choices. Preliminary single level multinomial models where seven fields of study (three academic and four professional fields of study) were compared indicated that major differences existed between academic and professional programmes, rather than between the different fields of study[3]. It was therefore decided to conduct the multilevel analyses in three steps, where each time a different outcome variable or educational choices was/were considered, namely:

1) The transition to a professional or an academic bachelor programme
2) The choice for one of the four professional bachelor programme clusters
3) The choice for one of the three professional teacher education programmes

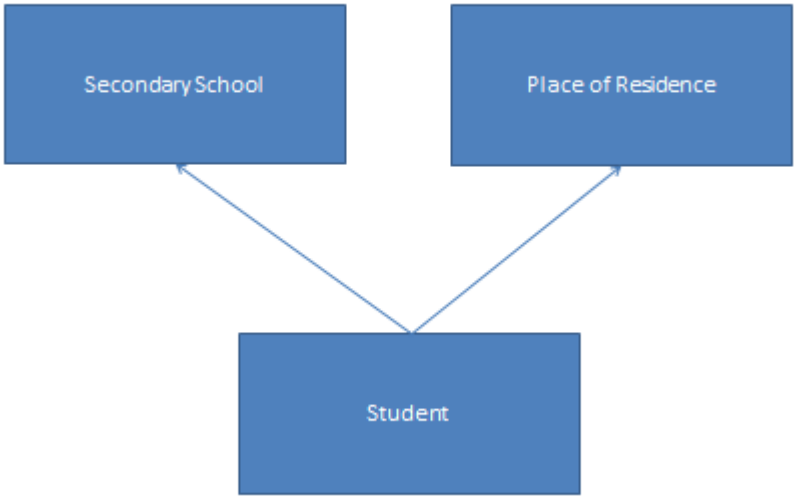
In this report only the first registration in higher education is considered. The aim of these analyses is to acquire more insight into the profiles of students who opt for a professional teacher education program in Flanders by comparing these students to students who opt for other higher education programmes. While doing this, we will not only consider differences in individual characteristics, but also consider the social contexts wherein students make their educational choices in. More precisely, we assume some variation in educational choices can be explained by taking into account the secondary school and the place of residence, as measured by the municipality a student lives in.

The structure of these data is non-hierarchical, since schools and residences are not necessarily nested: Pupils are nested in schools and municipalities, but schools and municipalities are not necessarily nested within each other. It is however true that students often frequent secondary schools in the vicinity of their place of residence. This results in a high correlation between both social contexts. Therefore, it is necessarily to take both schools and the place of residence into account in this kind of analyses, to be able to distinguish the effect of both contexts (See for example Owens (2010)). Figure 2 is a classification diagram, which represents the data structure in our models (Leckie 2009; Leckie 2013). As can be seen, pupils are nested in a cross-classification of their secondary

[3] The results of these preliminary analyses can be found in Appendix II.

schools and place of residence. This type of data structure is best modeled using cross-classified multilevel analysis (Leckie 2013).

**Figure 2: Classification Diagram**




The estimation of multinomial multilevel and cross-classified models using traditional maximum likelihood techniques lead to important computational limitations and difficulties (Browne and Rasbash 2009; Leckie 2009). Therefore, MCMC (Markov Chain Monte Carlo) estimation procedures (Browne and Rasbash 2009) with a minimum of 5000 iterations are used. The analyses were conducted using the MLwiN programme version 2.28 (Rasbash, Browne et al. 2000) with starting values from computational simpler models using traditional maximum likelihood estimation techniques, namely iterative generalised least squares (Leckie 2009). This analysis strategy is based on Jen et al. (2009).

The model fit is assessed in two ways. First, the Bayesian deviance information criterion is used (Browne and Rasbash 2009; Jen, Jones et al. 2009; Leckie 2009). A smaller DIC-value indicates a better fit of the model, where a difference of 10 can be considered as substantial. Second, we considered figures of residuals and predicted probabilities to assess model fit and the importance of the school and municipal contexts.

For each educational transition choice, a set of models will be considered. When conducting multilevel analyses, it is common to start with estimating unconditional models, or so-called null models. This is useful to get an insight in whether a multilevel analysis structure is appropriate, and if so, which one should be applied. Four possible structures will be compared:

1) A single level model, which does not take into account that some variation in the educational choices might lie at the secondary school or the residence level;
2) an unconditional multilevel model where municipality is included as higher level;
3) an unconditional multilevel model with schools included as higher level;
4) and a cross-classified unconditional multilevel model where both the place of residence and schools are included as higher levels.

Subsequently, model fit assessment is used to determine the optimal multilevel structure. This structure is then used to conduct analyses where step by step the individual and school factors will be included.

Two final remarks should be made in this section. First, coefficients are considered to be significant when their absolute value is more than twice the value of the respective standard error. Second, all continuous variables are grand mean centered in the analyses. This operation does not change the outcomes of the analyses, but facilitates computation.

## 1.3 Variables

### 1.3.1 Outcome variables

The dependent variables considered in this report are different subsets of postsecondary educational choices. As mentioned earlier, the aim of these analyses is to acquire an insight into the student population of the different professional teacher education programmes by comparing them to students who make other educational transition choices. The teacher education programmes considered in this report are the professional teacher education programmes, since direct enrollment in specific teacher education programmes is impossible and only the first registration of students in higher education is considered in our analyses.

First, we compare those students who opt for an academic versus a professional programme in higher education programmes. Secondly, those students who enroll in professional programmes are selected and divided into four different professional programme clusters, which are then compared. Finally, the students who enroll in teacher education programmes are selected and the differences in inflow in nursery, primary and secondary teacher education programmes are considered. These selections and the number

of students in every educational transition option considered were depicted in section by Figure 1.

### 1.3.2 Level 1: Explanatory variables at the individual level

The variables considered at the individual level are gender, grade retention, education form and nationality. Men will be considered as the reference category of the gender variable for all analyses. The second variable that will be considered is the education form the student attended in his last year of secondary education. Four different education forms can be distinguished when considering the third stage (i.e. the last two or three years) of Flemish mainstream secondary education[4]:

- *General secondary education (ASO)*, which places an emphasis on broad general education. This form of education provides a firm foundation for passing on to tertiary education. This education form is used as reference category in the analyses.
- *Technical secondary education (TSO)*, which places a special emphasis on general and technical/theoretical subjects. After this form of education, students can exercise a profession or pass on to tertiary education.
- *Secondary arts education (KSO)*, which combines a broad general education with active arts practice. After this form of education, students can exercise a profession or go on to tertiary education.
- *Vocational secondary education (BSO)*, which is a practice oriented type of education where students learn a specific occupation in addition to receiving general education.

  In Belgium, education is compulsory until the age of 18. However, from the age of 15 onwards, students following *vocational secondary education* can opt for part-time education.

The variable grade retention is in these analyses considered as a proxy for educational ability, since no prior educational achievement data was available. Other Flemish studies have used grade retention as an indicator for academic ability before, considering grade retention as an indicator of poor academic achievement (Alexander, Entwisle et al. 2002; Agirdag, Van Houtte et al. 2012). Administrative data on grade retention were not

[4] These definitions are taken from.Department of Education and Training (2008). Education in Flanders. A broad view of the Flemish educational landscape. Brussels, Department of Education and Training: 68.

available for students in the vocational track in secondary education. Because we did not want to exclude all these students from our analyses, a grade retention indicator was constructed based on expected age of graduation. If a vocational student is older than expected when graduating (older than 19 years old in the year of graduation), this student was suspected to have repeated a year. This variable is then coded as a dummy variable (0 = no grade retention, 1 = at least one year of grade retention). No grade retention is considered as the reference category in the analyses. Because we used age to calculate the level of grade retention for the vocational students, we could not include age as a variable in the analyses. Finally, the nationality variable is a binary variable (0 = Belgian; 1 = non-Belgian) and is constructed based on the nationality of the student as mentioned on his or her identity card or other documents of identification when the student registered for secondary school. For the descriptive statistics of these variables at the individual level we refer to Appendix III.

### 1.3.3 Level 2: Explanatory variables at the school and residence level

The secondary school level is identified by a school ID code. A strength is that the school composition variables available in the databases of the Department of Education are no averages of the students in our analyses, but reflect the composition of the entire school. Five secondary school variables are considered. The first three variables are the percentages (range 0-100%) of students in the three major different educational forms (ASO, TSO, BSO). The fourth variable is the proportion of 'equal opportunities' students in the second and third degree compared to all students in these two degrees. The Flemish 'equal opportunities' policy (in Dutch called 'Gelijke Onderwijskansenbeleid') is created to provide equal opportunities for every child. An 'equal opportunities' student in the second or third degree is defined as a student who can be characterised by at least one of the following indicators:

- The student did repeat more than one year
- The student changed schools and attended technical or vocational secondary education after his or her previous class committee decided the pupil did not sufficiently achieve the objectives of the curriculum[5]
- The student went to a reception class for foreign speaking newcomers in the previous academic year

[5] For those familiar with the Flemish educational system: The student received a B - or C-certificate

Therefore, the proportion of 'equal opportunities' indicates the proportion of students with at least one of these characteristics. This variable can vary from zero to one. Finally, the fifth variable considered is the educational network a school belongs to. This is a categorical variable with three categories that are:

- *GO! Education of the Flemish Community*, which is publicly run education organised under the authority of the Flemish Community. The *GO! Education* is required to be neutral: All religious, philosophical and ideological convictions of parents and pupils have to be respected.
- *Publicly funded, publicly run education (OGO)*, which comprises municipal education as well as provincial education.
- *Publicly funded, privately run education (VGO)*, which delivers education organised by a private organisation. This educational network mainly consists of catholic schools. This category will be used as the reference category in the analyses.

Finally, we will consider the place of residence of the students as a potential level in our analyses. We were provided with a municipality ID-code, which allows us to consider effects on the level of municipalities.

# Chapter 2: Academic versus Professional Bachelor Programmes

In this and the next two chapters, the results of the multilevel analyses are discussed. In this chapter, the most general comparison possible in higher education is made, namely a comparison between the students who enroll in academic versus professional programmes. In the next chapter, the professional programmes are divided into four major clusters, which are then compared to each other. Finally, in the fourth chapter, the three different professional teacher education programmes, namely nursery, primary and secondary teacher education programmes will be compared. Since the interpretation of the results of logistic and multinomial multilevel regression models is not straightforward, we will try to facilitate the interpretations using graphical representations of the results where relevant.

## 2.1 Unconditional Models

In this section, the results of the unconditional models, which can be found in Table 1, are discussed. The educational transition choice we considered here is the choice between an academic or professional bachelor programme. Model 2 and 3 suggest that the choice between an academic or professional bachelor programme is influenced by factors of the municipality and secondary school of a student. Since we are estimating logit multilevel models in this section instead of multinomial multilevel models, it is possible to estimate the intraclass correlation (ICC), which indicates the percentage of variation that can be explained by each level in the analysis. For more information on the ICC-values and how they are calculated, we refer to Bosker and Snijders (1999). As we can see in Table 1, approximately 2.5% of the variance can be attributed to the level of residence when considering Model 2. The ICC-value of Model 3 indicates 39% of the variation of the educational choice between academic and professional bachelor programmes is located at the school level. This seems to be high, but attention should be paid when interpreting this number: This variation will to a large extent be explained by the fact students are not randomly assigned to schools, but students with specific characteristics attend different schools. Finally, Model 4 is a cross-classified unconditional multilevel model where both the place of residence and schools are included as higher levels. It is clear that

simultaneously including the school and residence levels leads to a major reduction of the percentage of variation that can be explained at the residence level. Because of the correlation between both levels, this variation was overestimated in Model 2. The residual variation that can be attributed to the residence level is 0.35%. While this variation is significant, it can be considered as not substantial enough to look into any further.

**Table 1: Unconditional models, academic versus professional bachelor programmes**

| Reference category = Professional bachelor programmes | Model 1 (S.E.)<br>SINGLE LEVEL | Model 2 (S.E.)<br>PLACE OF RESIDENCE | Model 3 (S.E.)<br>SCHOOLS | Model 4 (S.E.)<br>CROSS-CLASSIFICATION |
|---|---|---|---|---|
| **Fixed parameters** | | | | |
| ***Constant*** | -0.209(0.010)* | -0.244(0.019)* | -0.695(0.056)* | -0.707(0.059)* |
| **Random parameters** | | | | |
| *Level: residence* | | | | |
| variance | | 0.082(0.011)* | | 0.019(0.007)* |
| *Level: schools* | | | | |
| variance | | | 2.133(0.141)* | 2.140(0.142)* |
| **DIC** | 53637 | 53148 | 42271 | 42248 |
| **ICC Residence** | | 2.43% | | 0.35% |
| **ICC Schools** | | | 39.33% | 39.27% |
| **Number of students** | 38.993 | 38.993 | 38.993 | 38.993 |
| **Number of municipalities** | - | 379 | - | 379 |
| **Number of schools** | - | - | 668 | 668 |

*p<0.05

This decision seems to be appropriate when considering the random intercepts of the cross-classified models, as represented by Figure 3 and Figure 4[6]. While there seem to be no differences between municipalities when interpreting Figure 3, Figure 4 indicates that there are significant differences between schools when considering the choice between academic and professional programmes. We can conclude that, even though the DIC-value is smallest for the cross-classified model, the hierarchical multilevel model where only the school level is included as higher level is appropriate.

[6] For more information on how these residuals are calculated, we refer to Rasbash et al. Rasbash, J., W. Browne, et al. (2000). A user's guide to MLwiN, University of London, Institute of Education, Centre for Multilevel Modelling.
.

**Figure 3: Random intercepts at the residence level**

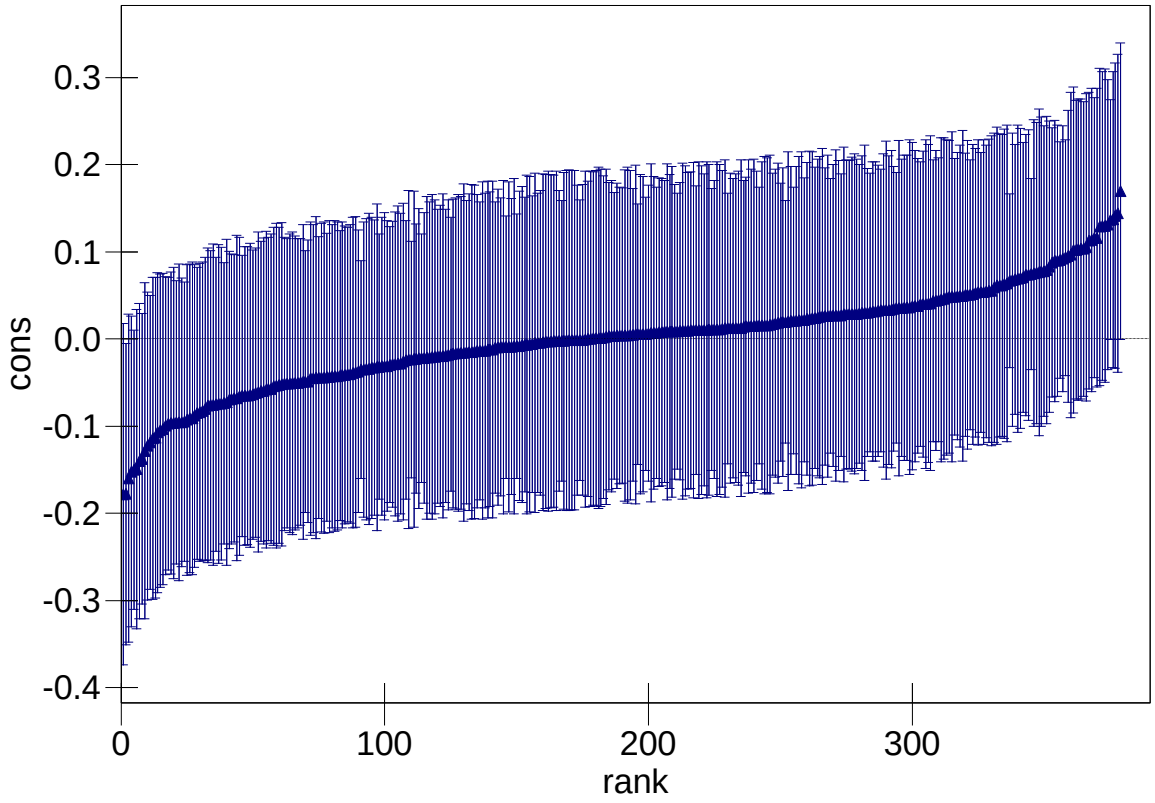
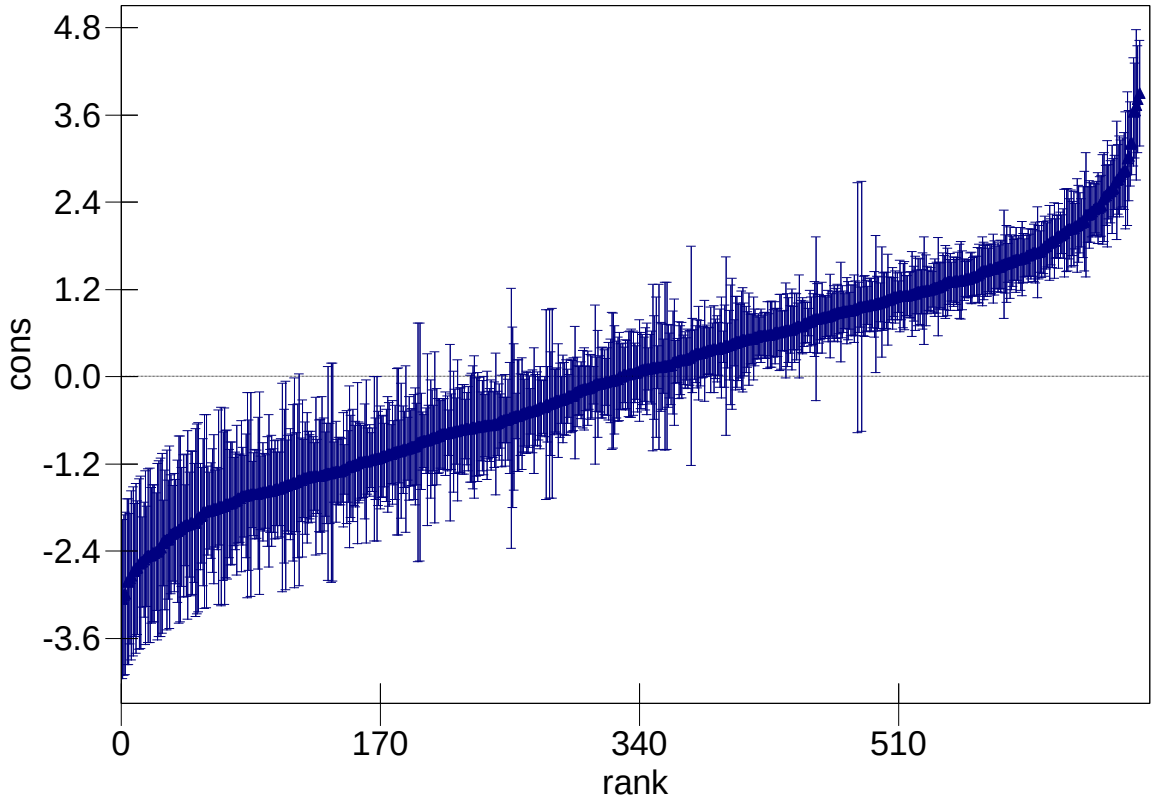



**Figure 4: Random intercepts at the school level**



## 2.2 Characteristics at the individual and school level

In this section we included the variables at the different levels in our models. The results of these analyses can be found in Table 2. Model 5 is a model where only the individual variables are included, while in Model 6 the variables at the school level are considered as well. While model 6 is a random intercept model, the random slopes were calculated in Model 7. These multivariate analyses clearly indicate that there are significant differences between the inflow in the academic and professional bachelor programmes, both at the individual and school level. Model 7 is considered as superior to Model 5 and Model 6 when considering the DIC-values.

**Table 2: Individual and school level variables, academic versus professional bachelor programmes**

| response: PBA = reference category | Model 5 (S.E.) | Model 6 (S.E.) | Model 7 (S.E.) |
|---|---|---|---|
| **Fixed parameters** | | | |
| ***Constant*** | 1.142(0.038)* | 1.183(0.109)* | 1.142(0.122)* |
| ***Individual factors*** | | | |
| Educational form (ref. category = ASO) | | | |
| BSO | -3.030(0.10)* | -2.932(0.104)* | -3.525(0.201)* |
| TSO | -2.727(0.046)* | -2.594(0.057)* | -2.632(0.082)* |
| KSO | -0.367(0.115)* | -0.435(0.118)* | -0.328(0.166) |
| Female | -0.634(0.028)* | -0.639(0.028)* | -0.639(0.033)* |
| Grade retention | -0.556(0.034)* | -0.561(0.034)* | -0.576(0.042)* |
| Non-Belgian | 0.720(0.103)* | 0.695(0.101)* | 0.743(0.122)* |
| ***Secondary school factors*** | | | |
| percentage_ASO | | -0.001(0.002) | -0.001(0.002) |
| percentage_BSO | | -0.007(0.002)* | -0.007(0.002)* |
| percentage_TSO | | -0.009(0.002)* | -0.008(0.002)* |
| proportion_GOK_indicator | | 1.090(0.369)* | 0.945(0.399)* |
| educational_network (ref. category = VGO) | | | |
| GO | | -0.302(0.121)* | -0.285(0.128)* |
| OGO | | -0.038(0.112) | -0.048(0.12) |
| **Random parameters** | | | |
| *Level: schools* | | | See Table 3 |
| Variance | 0.338(0.029)* | 0.313(0.028)* | - |
| **Deviance information criterion (DIC)** | 38542 | 38514 | 38190 |
| **Intraclass Correlation Schools** | 9.32% | 8.69% | 11.23% |
| **Number of students** | 38993 | 38981 | 38981 |
| **Number of schools** | 668 | 664 | 664[7] |

* p<0.05

[7] There are four schools missing in these analyses because the level of equal opportunities students in these schools was unknown.

**Table 3: Individual and school level variables, between-school variation Model 7**

| | Constant | BSO | TSO | KSO | Female | Grade_ret. | Non-Belgian |
|---|---|---|---|---|---|---|---|
| Constant | 0.420(0.06)* | | | | | | |
| BSO | -0.52(0.17)* | 2.00(0.55)* | | | | | |
| TSO | -0.32(0.07)* | 0.61(0.21)* | 0.62(0.12)* | | | | |
| KSO | -0.07(0.13) | 0.01(0.25) | 0.01(0.15) | 0.42(0.21)* | | | |
| Female | -0.05(0.04) | 0.02(0.10) | 0.03(0.05) | -0.03(0.06) | 0.11(0.03)* | | |
| Grade_retention | -0.11(0.05)* | 0.26(0.11)* | 0.10(0.06) | -0.05(0.08) | 0.01(0.03) | 0.23(0.05)* | |
| Non-Belgian | 0.10(0.11) | -0.13(0.25) | -0.0820.14) | -0.06(0.15) | -0.04(0.07) | 0.02(0.08) | 0.55(0.22)* |

* p<0.05

### 2.2.1 Interpretation of the variables at the individual level

We interpret the results of this final model using figures based on Model 7. Figure 5 represents the probabilities of inflow in the academic versus the professional bachelor programmes when considering the different education forms. We can see that the probability of continuing to an academic programme is estimated to be 5% when a student attended vocational secondary education (BSO) in his last year of secondary education, at the mean of all the other variables[8]. This also means that the probability that a student who attended vocational secondary education will continue to a professional bachelor programme is 95% conditional on the fact that this student continues to higher education. The bars on this type of figures represent the 95% confidence intervals of the estimated probabilities. A student who attended general secondary education (ASO) has clearly a higher probability of continuing to an academic programme than a student who attended vocational or technical secondary education (TSO): The estimated probability for general secondary education is 64%. The probability for those who attended technical secondary education is 11%, while for those who attended secondary arts education (KSO) the probability is 56%.

[8] The average school in our sample has:
42.3% of students in general secondary education
21.7% of students in technical secondary education
14.0% of students in vocational secondary education
9.7% of students with an indicator of equal opportunities

**Figure 5: Predicted probabilities of continuing to an academic programme by education form**

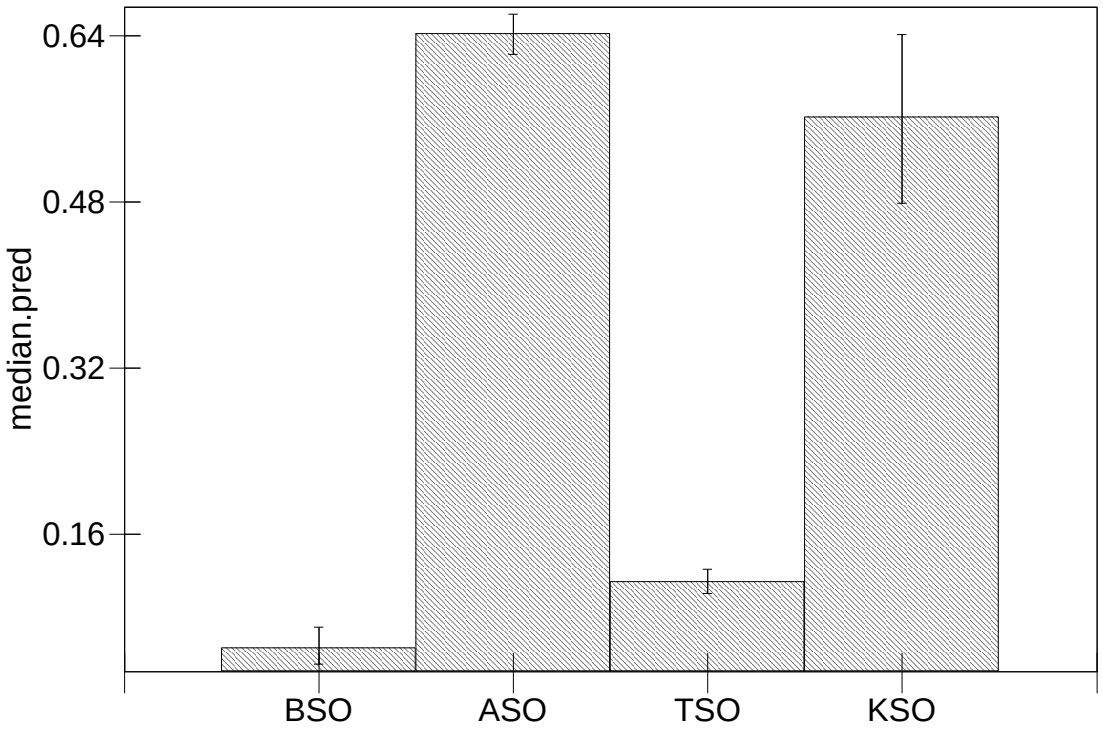
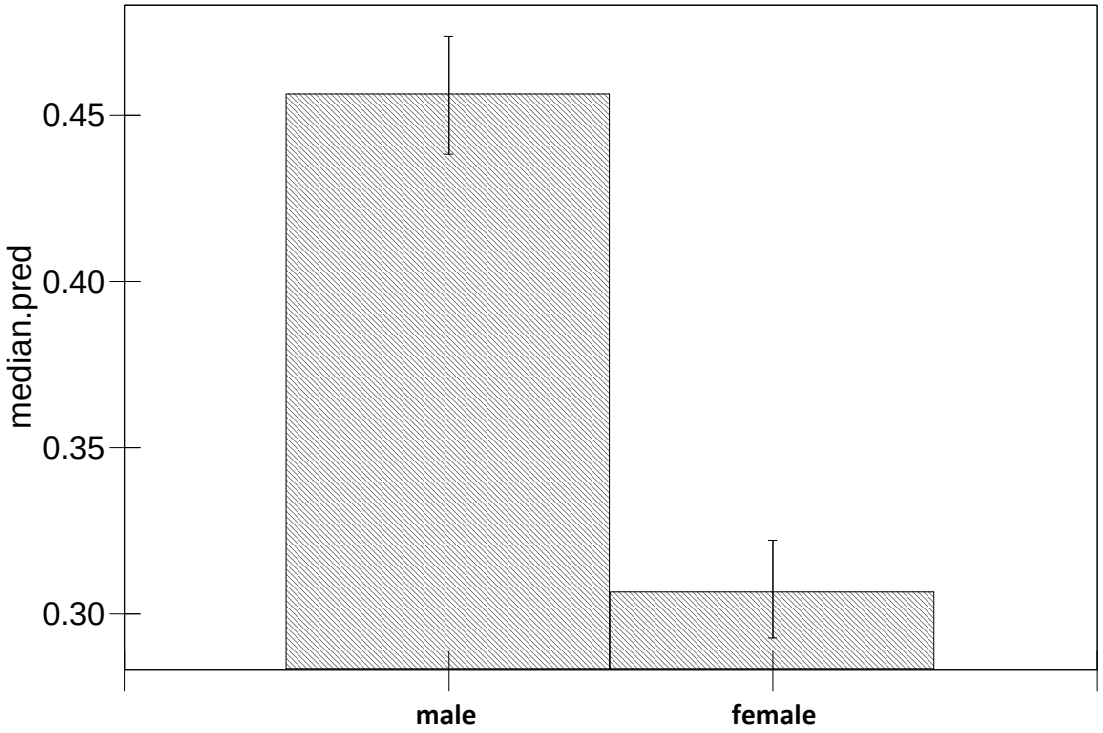



Figure 6 reports the transition probabilities of continuing to an academic bachelor programme by gender. It is clear that men have a higher probability of continuing to this type of programme compared to women. However, for both sexes the probability of continuing to an academic programme is lower than the probability of continuing to a professional programme. This is to be expected, as in our dataset 21.520 students continued to a professional programme, while 17.473 students continued to an academic programme. Men have a chance of 46% to continue to an academic programme, while for women this is 31%.

**Figure 6: Predicted probabilities of continuing to an academic programme by gender**




We now consider the probabilities of students who did or did not repeat a year in secondary education in Figure 7. It is clear that students who had to repeat a year in secondary education have a much lower probability of continuing to an academic programme compared to those who succeeded every year (28% versus 41%).

**Figure 7: Predicted probabilities of continuing to an academic programme, grade retention**

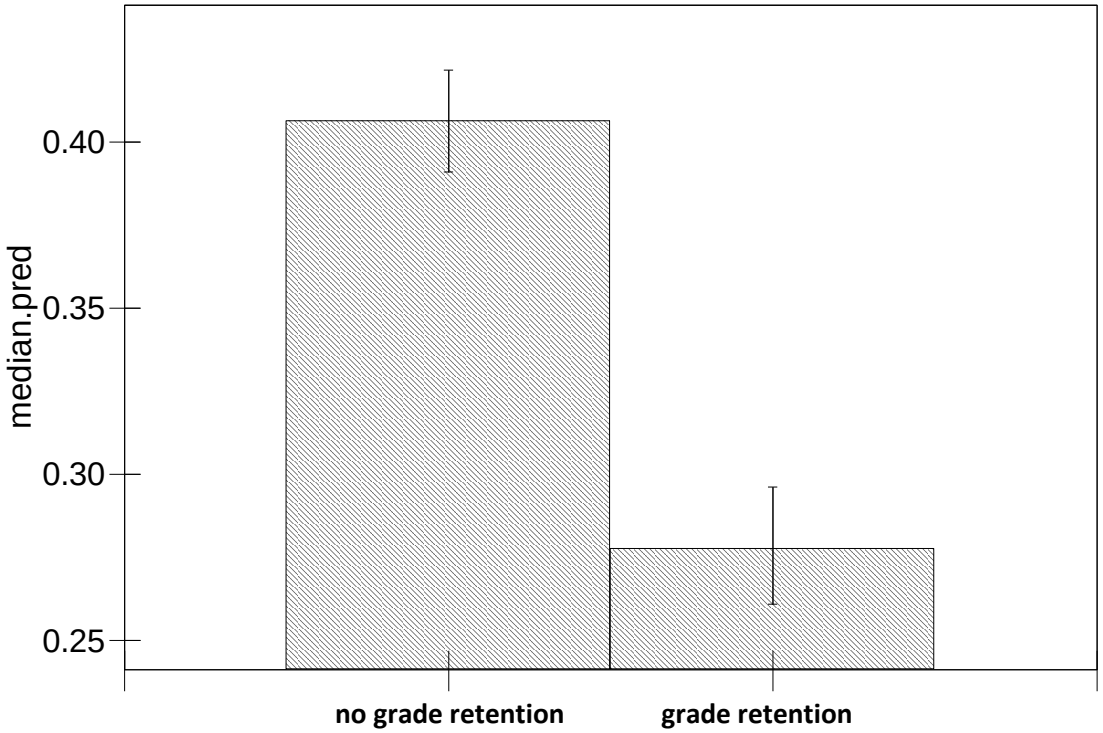
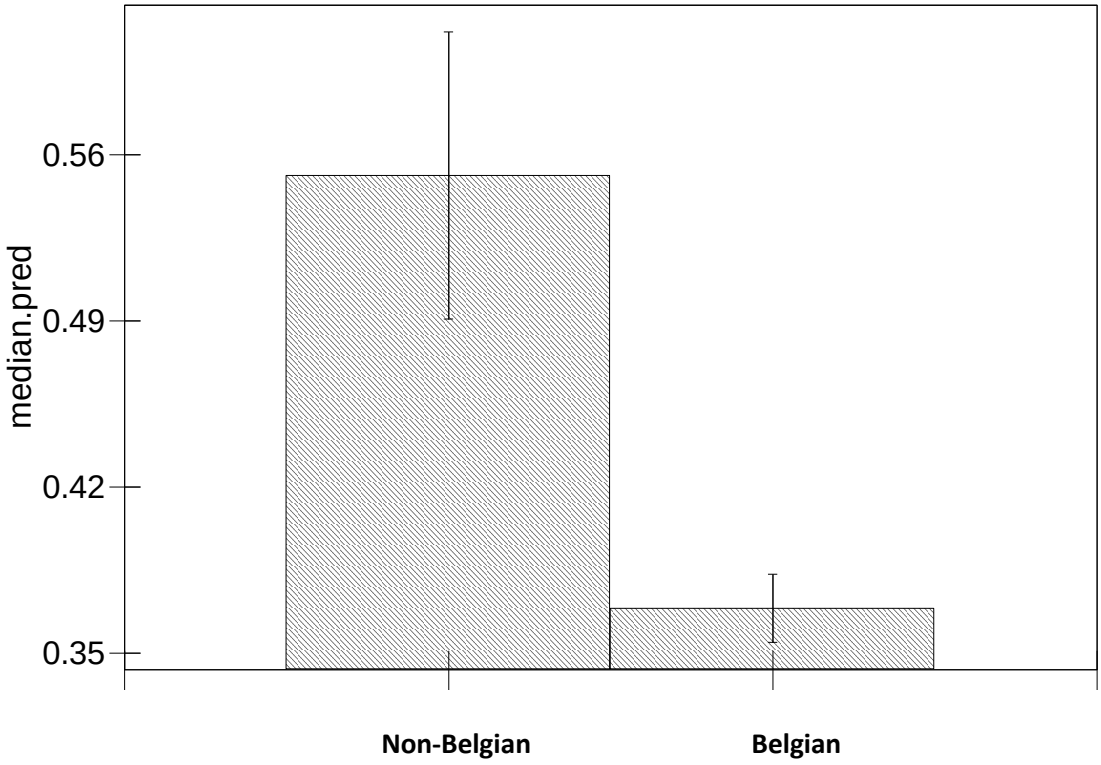



Figure 8 reports the probabilities of continuing to an academic programme when comparing students who have and do not have the Belgian nationality. It is clear that, of those students that enrol in higher education in Flanders, students who do not have the Belgian nationality are more likely than Belgian students to continue to an academic programme rather than a professional programme, ceteris paribus.

**Figure 8: Predicted probabilities of continuing to an academic programme by nationality**




## 2.2.2 Interpretation of the variables at the school level

We will now consider the effects of the school level variables on the likelihood of continuing to an academic programme rather than a professional programme. The effect of the percentage of general secondary education students in a school was shown to be not significant in Table 2. This means a students' likelihood to opt for an academic programme rather than a professional one is not influenced by the percentage of general secondary education students in the school he or she attended. However, the percentage of technical secondary education students in a student's secondary school was found to have a significant influence on the probability he or she will opt for an academic or a professional bachelor programme. Figure 9 demonstrates the effect of this school level variable. An increasing number of students attending technical secondary education lessens a student's probability of continuing to an academic bachelor programme rather than a professional bachelor programme. The same effect is found for the percentage of students in vocational secondary education. These results are represented by Figure 9. Attention should be paid to the interpretation of these figures, as these figures are produced while the other variables are held constant at their mean.

**Figure 9: Predicted probabilities of continuing to an academic programme, percentage of students in technical secondary education**

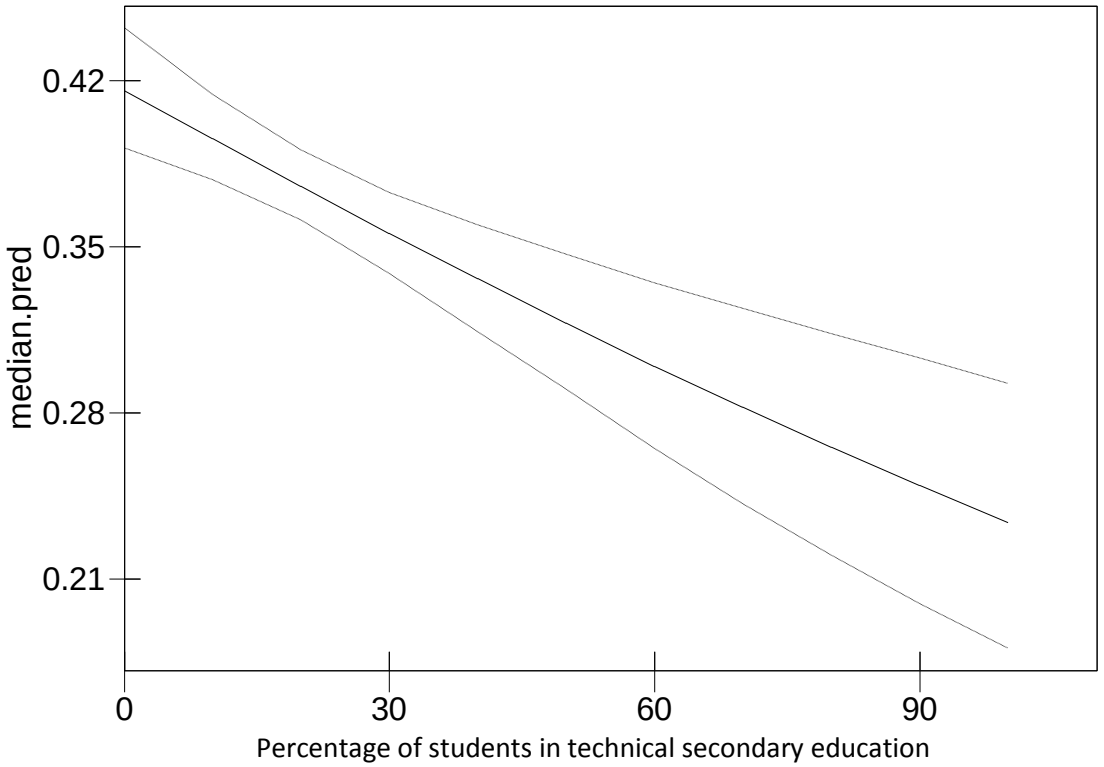
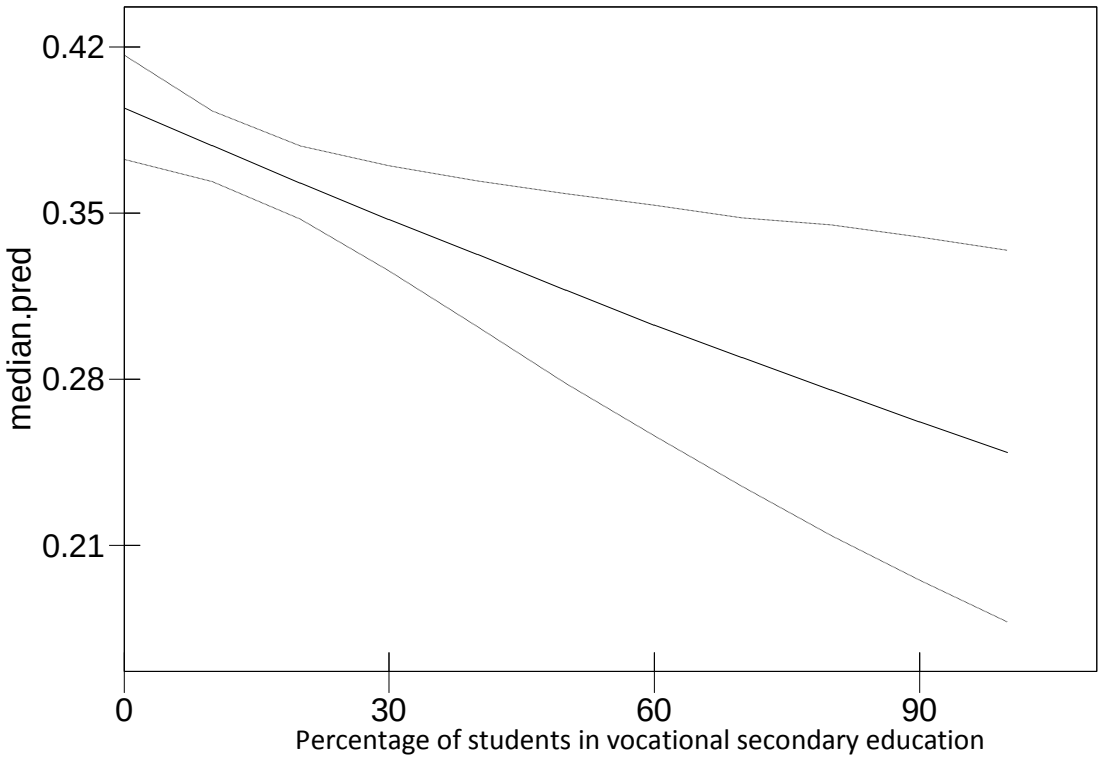
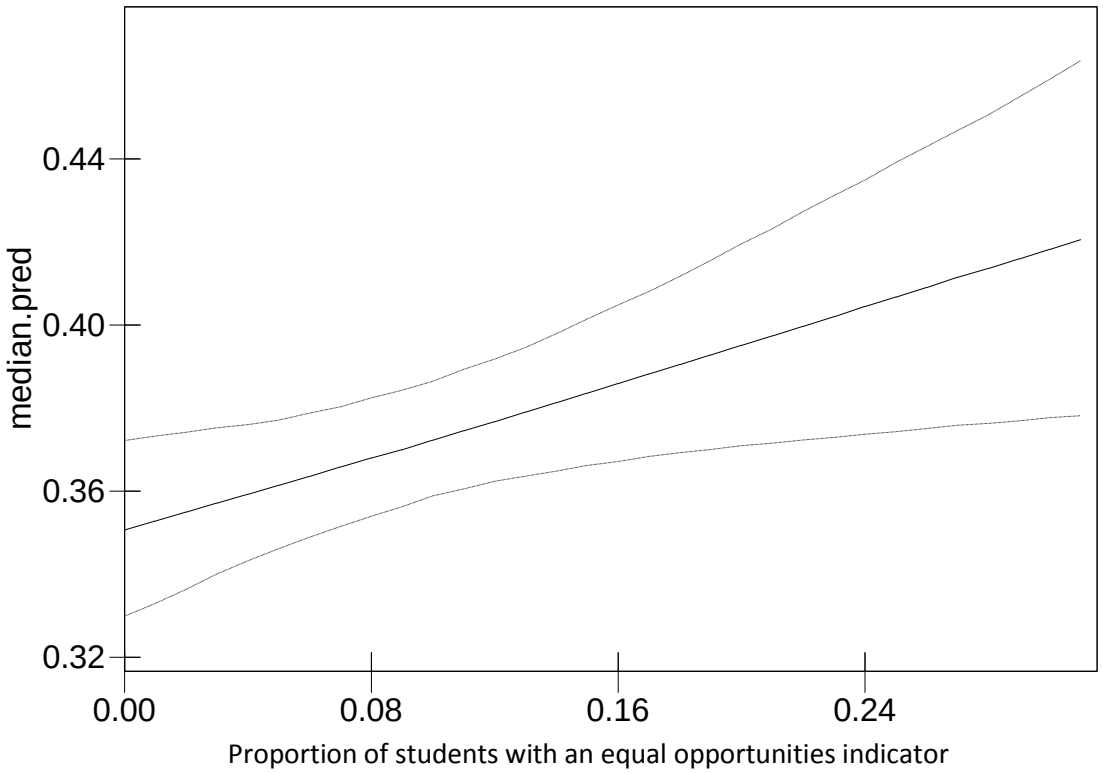



**Figure 10: Predicted probabilities of continuing to an academic programme, percentage of students in vocational secondary education**



The next school level variable that was considered in our model is the proportion of students that can be characterised with at least one equal opportunities indicator. Since the minimum of this variable was zero and its maximum 0.31, we only calculated the probabilities within this range. These probabilities are represented by Figure 11. This variable was found to have a significant influence on the probability a student continues to an academic programme rather than a professional one. However, when the calculated probabilities and their confidence bounds are taken into account, the effect of this variable seems not very substantial. The average student who attended a secondary school with no equal opportunities students has a probability of between 33 and 37% to continue to an academic programme when this student decides to continue to higher education. A student who attended a school with the maximum proportion of equal opportunities students considered, namely 31%, has a probability of between 38 and 46% of continuing to an academic programme in higher education. The difference between both confidence bounds is therefore only 1%.

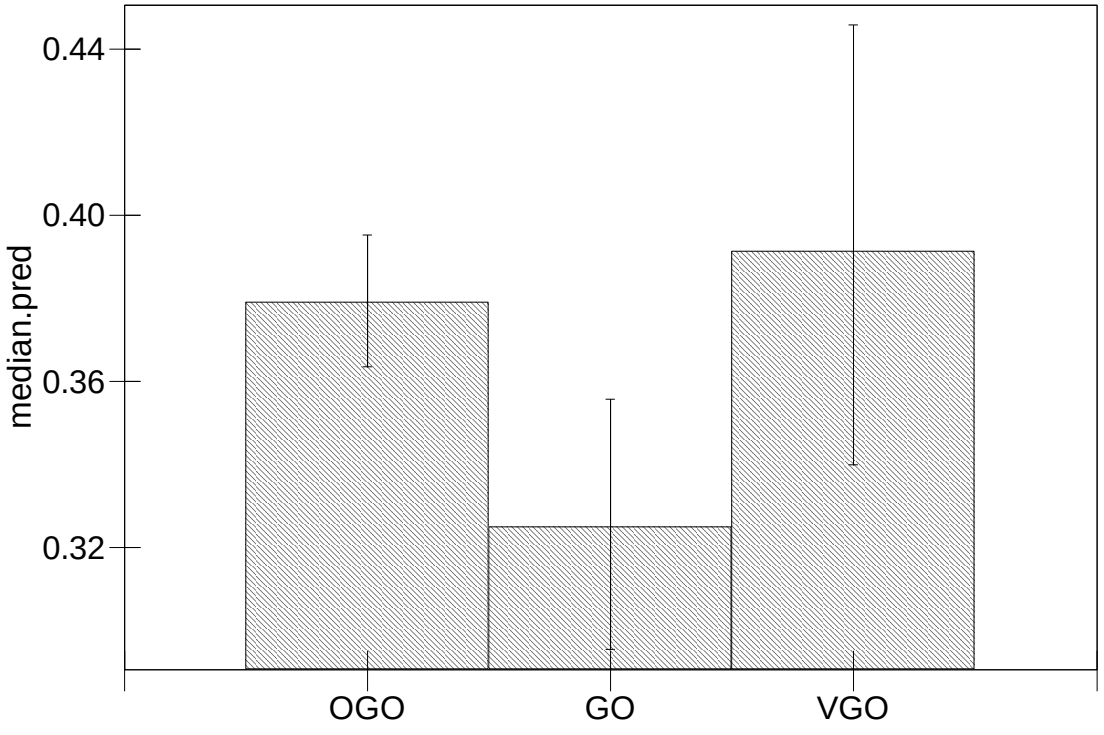
**Figure 11: Predicted probabilities of continuing to an academic programme, proportion of students with an equal opportunities indicator**




The final school level variable we considered was the educational network a school belongs to. The results are represented by Figure 12. The results indicate that the probability of opting for an academic programme rather than a professional one is

significantly lower when a student attended a secondary school organized by the Flemish community (GO!) rather than a municipally or provincially organized one (OGO). While there is a significant difference between both educational networks, the difference in the probability of enrolment in an academic programme is less than 4 percentage points between both networks. The privately organized schools (VGO) did not significantly different from the other educational networks considering the probability of continuing to an academic bachelor programme. We want to stress that these results should not interpreted as causal. It is very likely we were not able to correct for the non-random inflow of students in the different educational networks, causing a selection bias in our analyses which caused a significant effect of the type of educational networks. The profiles of students in these different types of educational networks are likely to be different from each other, apart from the characteristics we already included in our analyses. We can therefore only say we found a significant effect of the type on educational networks on the likelihood of inflow in an academic programme, given the variables we included in the analysis. Again, the effect of educational networks is not substantial: the confidence bounds of the probabilities of inflow of OGO schools and schools organised by the Flemish community are only 0.5 percentage points apart from each other.

**Figure 12: Predicted probabilities of continuing to an academic programme by educational network**



We can conclude this chapter by stating that the profiles of students in academic and professional programmes are significantly different from each other, when taking into account several variables at both the individual and secondary school level of inflowing students. However, while several secondary school characteristics were found to have a significant impact on the probability of opting for an academic programme, only a small part of the variance that lies on the secondary school level is explained by these variables. It is clear that much more characteristics of secondary schools play a role in the educational choices of their students than only those considered in these analyses.

We would like to remind the readers that the educational choices considered in this paper are hypothesized to be sequential. We first considered the choice between academic and professional programmes and will now divide this professional choice into four alternatives, four different professional clusters. Finally, we will consider the differences in profiles between the three different types of professional teacher education programmes.

# Chapter 3: A comparison of four professional bachelor clusters

We divided all Flemish bachelor programmes into four major clusters. As we already mentioned, more information on this subdivision can be found in Appendix I. The four clusters that are compared are: PBA Teacher Education (which will be used as the reference category throughout the analyses), PBA Humanities, Social Sciences & Arts, PBA Biomedical Sciences and PBA Science, Engineering and Technology. Multinomial multilevel analyses are used to compare these four clusters. We will use the same approach as in the previous section: We start by comparing some unconditional models to decide which multilevel structure leads to the best fit, after which models are estimated where variables at both the individual and school level are included.

## 3.1 Unconditional Models

In Table 4 and Table 5 we compared a single level model (Model 1) with a multilevel model with as higher level municipalities (Model 2), a multilevel model with as higher level secondary schools (Model 3) and finally a cross-classified model with both municipalities and secondary schools as higher levels (Model 4). The conclusions we can draw from these unconditional models are similar to the ones of the unconditional models discussed in section 2.1 when we were comparing academic and professional models: The variance at the residence level seems to be significant when secondary schools are not taken into account (Model 2), but when secondary schools and municipalities are taken into account simultaneously, the variation at the residence level is greatly reduced. The DIC-values clearly indicate the hierarchical multilevel model where only secondary schools are included as the higher level is superior to the other models. In the next section, we will use this multilevel structure when including the variables at the individual and school level in our model.

## 3.2 Characteristics at the individual and school level

The results of the models wherein individual and school level variables are considered, are depicted in Table 6. Model 5 is a random intercept model where only the influence of individual factors is considered. In Model 6, the significant school level variables are included in the random intercept model. Model 7 is a random slopes model where the effects of the individual factors are allowed to vary across schools. The covariance structure of this model is considered to be diagonal.

The percentage of students in technical and vocational secondary education, the proportion of equal opportunities students and the educational networks were not found to influence the probability of opting for a specific professional bachelor cluster. We did not report all the estimated models including these school factors, but chi-square tests to evaluate the significance of the included variables and the DIC-values to evaluate model fit indicated the model where only percentage of general secondary education students was included at the school level was superior to models where other school factors were taken into account. This is somewhat surprising, since the percentage of general secondary education students was not a significant variable in the models where the inflow in academic versus professional programmes was compared. While the percentage of general secondary education students did not have an influence on the likelihood of choosing an academic rather than a professional programme, this percentage does influence the likelihood of opting for a specific professional cluster conditionally on opting for a professional bachelor programme.

The inclusion of random slopes in Model 7 leads to a major improvement of the model fit, as indicated by the decrease of the DIC-value. When considering the estimated random effects in Table 7, it becomes clear that the effect of the BSO and TSO-indicators are significantly different across secondary schools. This is true for all clusters. Apart from the constant, the other random effects are not found to be significant, indicating that the effect of these variables does not significantly vary across schools.

So why are the effects of vocational and technical secondary education so different across schools? We believe this can be explained by the heterogeneity of technical and vocational secondary education. A wide range of specialisations and trainings are offered, and we assume the differences in effects can be explained by the different offer of specialisations and trainings in the secondary schools. This idea needs some additional

explanation. When considering Table 8, it becomes clear that the inflow of a vocational student in a specific professional cluster in higher education depends on the specialisation this student chose. While more than 60 different specialisations are offered in vocational secondary education, we can see that for every cluster more than 50 percent of the inflow of vocational students can be attributed to five specialisations. For the education, humanities and biomedical cluster, more than 75 percent of these students come from five specialisations. The effect of vocational (and also technical) secondary education will therefore vary across schools, because not all secondary schools offer the same specialisations. We checked this for some schools where the vocational effect was estimated to be very high compared to the other schools when considering the technology cluster, and found that these schools mainly offered technical specialisations.

**Table 4: Unconditional models, comparison PBA clusters**

| reference = PBA Teacher Education | SINGLE LEVEL | | | PLACE OF RESIDENCE | | |
|---|---|---|---|---|---|---|
| | HUMANITIES | BIOMEDICAL | TECHNOLOGY | HUMANITIES | BIOMEDICAL | TECHNOLOGY |
| | Model 1a (S.E.) | Model 1b (S.E.) | Model 1c (S.E.) | Model 2a (S.E.) | Model 2b (S.E.) | Model 2c (S.E.) |
| **Fixed parameters** | | | | | | |
| ***Constant*** | 0.605(0.017)* | -0.670(0.023)* | -0.277(0.021)* | 0.672(0.035)* | -0.727(0.041)* | -0.522(0.073)* |
| **Random parameters** | | | | | | |
| *Level: residence* | | | | | | |
| Variance | | | | 0.235(0.034)* | 0.219(0.039)* | 1.357(0.157)* |
| covariance a & b° | | | | 0.027(0.027) | | |
| covariance a & c° | | | | 0.084(0.055) | | |
| covariance b & c° | | | | -0.013(0.059) | | |
| *Level: schools* | | | | | | |
| variance | | | | | | |
| covariance a & b° | | | | | | |
| covariance a & c° | | | | | | |
| covariance b & c° | | | | | | |
| **Deviance information criterion (DIC)** | | 54923 | | | 51922 | |
| **Number of students** | | 21520 | | | 21520 | |
| **Number of municipalities** | | - | | | 362 | |
| **Number of schools** | | - | | | - | |

°a = HUMANITIES; b = BIOMEDICAL; c = TECHNOLOGY * p<0.05

**Table 5: Unconditional models, comparison PBA clusters (cont.)**

| reference = PBA Teacher Education | SCHOOLS | | | CROSS-CLASSIFICATION | | |
|---|---|---|---|---|---|---|
| | HUMANITIES | BIOMEDICAL | TECHNOLOGY | HUMANITIES | BIOMEDICAL | TECHNOLOGY |
| | Model 3a (S.E.) | Model 3b (S.E.) | Model 3c (S.E.) | Model 4a (S.E.) | Model 4b (S.E.) | Model 4c (S.E.) |
| **Fixed parameters** | | | | | | |
| ***Constant*** | 0.570(0.032)* | -0.847(0.040)* | -0.696(0.068)* | 0.679(0.052)* | -0.706(0.056)* | -1.048(0.120)* |
| **Random parameters** | | | | | | |
| *Level: residence* | | | | | | |
| Variance | | | | 0.035(0.016)* | 0.015(0.010) | 0.026(0.020) |
| covariance a & b° | | | | 0.005(0.011) | | |
| covariance a & c° | | | | -0.006(0.012) | | |
| covariance b & c° | | | | -0.001(0.009) | | |
| *Level: schools* | | | | | | |
| Variance | 0.368(0.038)* | 0.342(0.047)* | 2.309(0.183)* | 0.382(0.042)* | 0.346(0.049)* | 2.681(0.243)* |
| covariance a & b° | 0.031(0.030) | | | 0.057(0.035) | | |
| covariance a & c° | -0.062(0.063) | | | -0.075(0.075) | | |
| covariance b & c° | -0.286(0.075)* | | | -0.295(0.088)* | | |
| **Deviance information criterion (DIC)** | | 48130 | | | 48300 | |
| **Number of students** | | 21520 | | | 21520 | |
| **Number of municipalities** | | - | | | 362 | |
| **Number of schools** | | 665 | | | 665 | |

°a = HUMANITIES; b = BIOMEDICAL; c = TECHNOLOGY * p<0.05

**Table 6: Individual and school level variables, comparison PBA clusters**

| reference = PBA Teacher Education | Random Intercept Model | | | Random Intercept Model | | | Random Slopes Model | | |
|---|---|---|---|---|---|---|---|---|---|
| | HUMANITIES | BIOMEDICAL | TECHNOLOGY | HUMANITIES | BIOMEDICAL | TECHNOLOGY | HUMANITIES | BIOMEDICAL | TECHNOLOGY |
| | Model 5a (SE) | Model 5b (SE) | Model 5c (SE) | Model 6a (SE) | Model 6b (SE) | Model 6c (SE) | Model 7a (SE) | Model 7b (SE) | Model 7c (SE) |
| **Fixed parameters** | | | | | | | | | |
| ***Constant*** | 1.077(0.054)* | -1.353(0.078)* | 0.115(0.084) | 1.036(0.06)* | -1.301(0.085)* | 0.295(0.090)* | 1.034(0.061)* | -1.247(0.087)* | 0.185(0.089)* |
| ***Individual factors*** | | | | | | | | | |
| Educational form (ref. category = ASO) | | | | | | | | | |
| BSO | -0.677(0.078)* | -0.510(0.102)* | -0.533(0.126)* | -0.624(0.088)* | -0.588(0.117)* | -0.801(0.141)* | -0.613(0.108)* | -1.277(0.202)* | -0.796(0.194)* |
| TSO | -0.143(0.052)* | -0.079(0.065) | 0.190(0.084)* | -0.096(0.064) | -0.156(0.085) | -0.063(0.101) | -0.086(0.081) | -0.255(0.097)* | 0.038(0.134) |
| KSO | -0.818(0.164)* | -2.127(0.307)* | 1.573(0.198)* | -0.755(0.173)* | -2.208(0.307)* | 1.284(0.207)* | -0.627(0.175)* | -1.965(0.366)* | 1.301(0.255)* |
| Female (ref. category = male) | -0.677(0.041)* | 0.917(0.068)* | -1.862(0.060)* | -0.679(0.041)* | 0.918(0.067)* | -1.860(0.059)* | -0.674(0.043)* | 0.917(0.069)* | -1.877(0.068)* |
| grade_retention | 0.097(0.041)* | -0.100(0.058) | 0.067(0.056) | 0.099(0.040)* | -0.100(0.058) | 0.064(0.056) | 0.095(0.042)* | -0.133(0.059)* | 0.070(0.058) |
| Non-Belgian (ref. category = Belgian) | 0.942(0.169)* | 0.687(0.221)* | 0.629(0.241)* | 0.934(0.168)* | 0.676(0.221)* | 0.603(0.238)* | 1.015(0.18)* | 0.721(0.233)* | 0.455(0.343) |
| ***Secondary school factors*** | | | | | | | | | |
| percentage_ASO | | | | 0.003(0.001)* | -0.002(0.001) | -0.011(0.002)* | 0.003(0.001)* | -0.002(0.001) | -0.005(0.002)* |
| **Random parameters school level** | | | | | | | | | |
| Variance | 0.383(0.040)* | 0.273(0.040)* | 1.401(0.125)* | 0.383(0.039)* | 0.266(0.039)* | 1.286(0.166)* | | | |
| covariance a & b° | 0.025(0.030) | | | 0.029(0.029) | | | See **Table 7** | | |
| covariance a & c° | -0.103(0.051)* | | | -0.087(0.05) | | | | | |
| covariance b & c° | 0.056(0.060) | | | 0.043(0.056) | | | | | |
| **Deviance information criterion (DIC)** | | 46219 | | | 46202 | | | 45689 | |
| **Number of students** | | 21520 | | | 21520 | | | 21520 | |
| **Numer of schools** | | 665 | | | 665 | | | 665 | |

°a = HUMANITIES; b = BIOMEDICAL; c = TECHNOLOGY * p<0.05

**Table 7: Individual and school level variables, comparison PBA clusters, random effects model 7**

| | variance (S.E.) |
|---|---|
| cons_humanities | 0.122(0.031)* |
| cons_biomedical | 0.038(0.033) |
| cons_technology | 0.240(0.087)* |
| BSO_humanities | 0.471(0.184)* |
| TSO_humanities | 0.587(0.087)* |
| KSO_humanities | 0.078(0.128) |
| BSO_biomedical | 1.675(0.439)* |
| TSO_biomedical | 0.324(0.081)* |
| KSO_biomedical | 0.337(0.639) |
| BSO_technology | 1.574(0.555)* |
| TSO_techology | 2.235(0.294)* |
| KSO_technology | 0.763(0.616) |
| women_humanities | 0.057(0.029) |
| women_biomedical | 0.021(0.022) |
| women_technology | 0.117(0.090) |
| grad_ret_humanities | 0.009(0.011) |
| grad_ret_biomedical | 0.012(0.017) |
| grad_ret_technology | 0.027(0.034) |
| non-Belgian_humanities | 0.223(0.356) |
| non-Belgian_biomedical | 0.070(0.134) |
| non-Belgian_technology | 0.970(1.223) |

* $p<0.05$

**Table 8: Most frequented specialisations in vocational secondary education according to chosen professional cluster (% of vocational students inflowed in the according cluster)**

| Name of specialisation in vocational secondary education | Dutch name | Education | Humanities | Biomedical | Technology |
|---|---|---|---|---|---|
| Administration and Data Management | Kantooradministratie en gegevensbeheer | 30.8% | 61.1% | 8.7% | 15.7% |
| Child Care | Kinderzorg | 28.9% | 6.6% | 21.0% | 1.8% |
| Unnamed Year | Naamloos leerjaar | 6.3% | 8.4% | 1.3% | 13.8% |
| Hair Stylist | Haarstilist | 5.5% | 1.5% | 0.4% | 0.5% |
| Shop Management and Window Dressing | Winkelbeheer en etalage | 4.8% | 3.4% | 3.1% | 3.2% |
| Domiciliary and Eldery Care | Thuis- en bejaardenzorg/zorgkundige | 2.8% | 2.1% | 21.0% | 1.8% |
| Nursing | Verpleegkunde | 0.4% | 0.6% | 36.2% | 0.0% |
| Industrial Electricity | Industriële elektriciteit | 1.4% | 1.2% | 0.0% | 8.8% |
| Publicity and Illustration | Publiciteit en illustratie | 1.2% | 1.2% | 0.9% | 7.4% |
| Green Management | Groenbeheer en -verfraaiing | 0.5% | 0.0% | 0.0% | 5.1% |
| **Sum of 5 most frequent specialisations** | | 76.2% | 81.6% | 87.3% | 50.7% |

### 3.2.1 Interpretation of the variables at the individual level

In this section we focus on the interpretation of the variables at the individual level based on the outcomes of Model 7 in Table 6. Considering the probabilities of education forms in Figure 13, we can see that vocational students have a higher probability than the other education forms to enroll in the Education cluster. The enrolment probabilities of vocational students (BSO) in the Education and Humanities clusters are not significantly different, while the latter is a much bigger cluster in which far more students enroll (see Figure 1 for the numbers of students enrolling in the different professional clusters). The enrolment probabilities of the other three education forms within the cluster of Education do not significantly differ from each other. The profiles of the other three clusters look quite similar to each other when considering the proportions of education forms. The only real noticable difference is the enrolment probabilities of the secondary arts students in the different clusters, particularly the technology cluster. This can be explained by the fact that subjects such as architecture and product development are included in this cluster.

**Figure 13: Predicted probabilities of continuing to a specific professional cluster by education form**

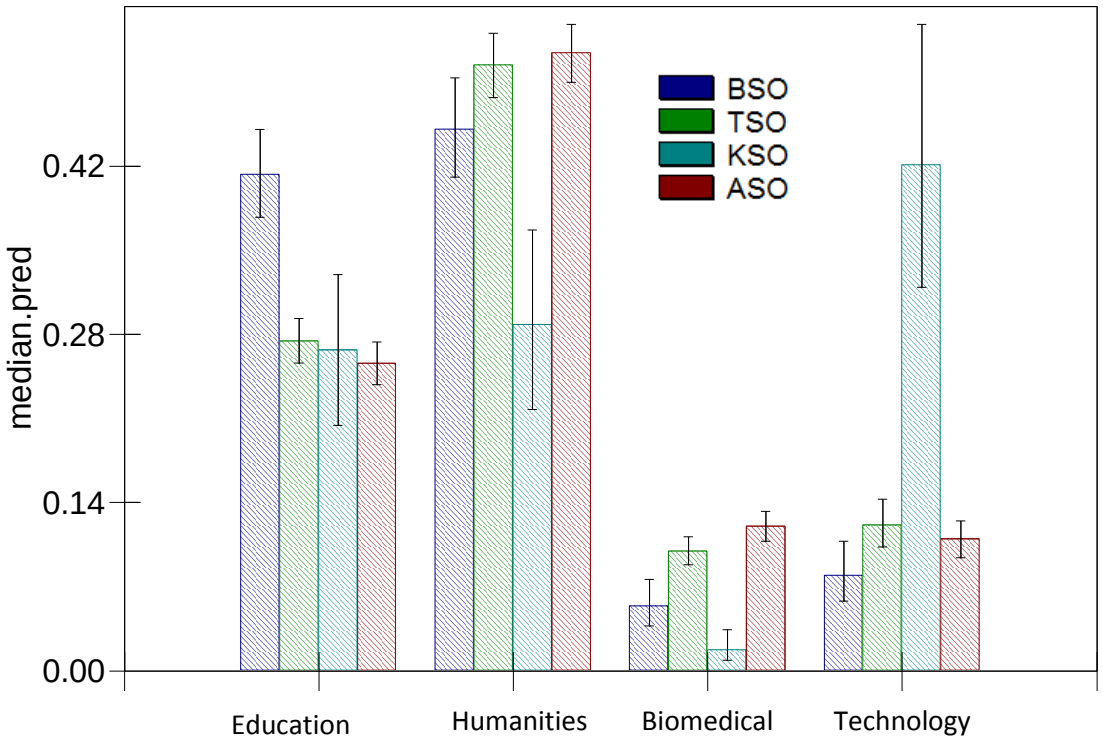
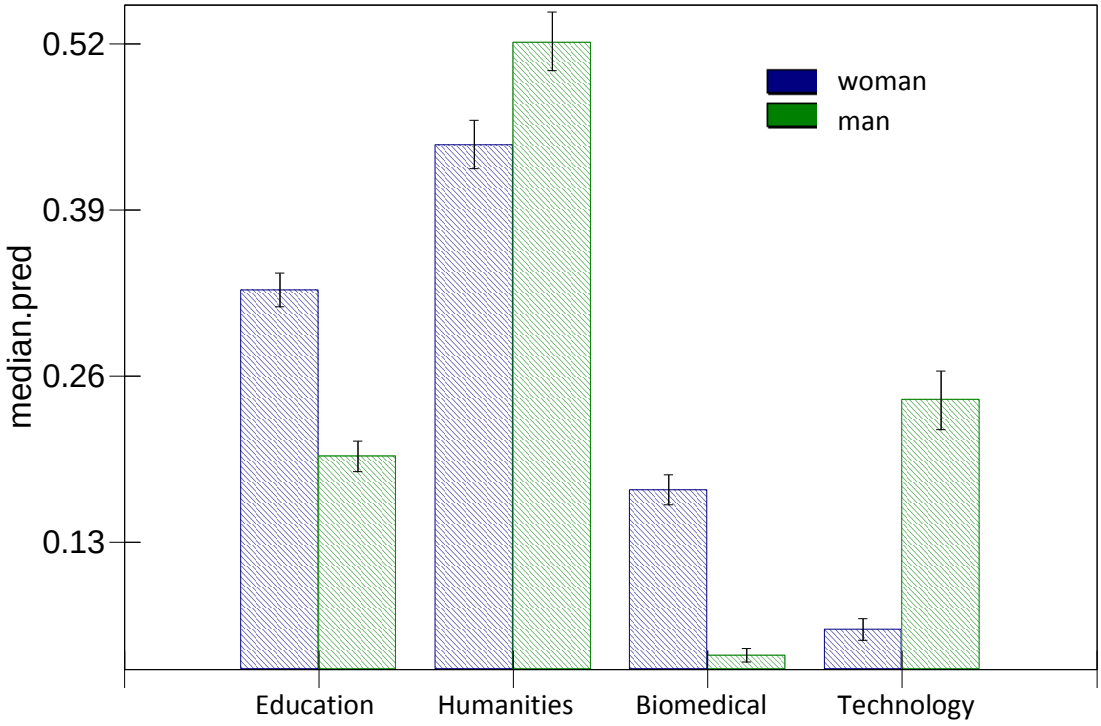


Figure 14 reports the transition probabilities to each cluster according to gender. The feminine character of the Education and Biomedical clusters is very clear: Women are more likely to opt for these clusters than men, ceteris paribus. The opposite is true for the Humanities and the Technology cluster. However, disparity between the transition probabilities of both sexes is much more clear-cut for the latter.

**Figure 14: Predicted probabilities of continuing to a specific professional cluster by gender**




While in the previous section we found the enrolment probabilities of students with and without grade retention differed significantly when comparing the choice for an academic and professional programme (see Figure 7), we did not find significant differences between the enrolment probabilities for the four professional clusters when both types of students are compared. This can be seen in Figure 15.

**Figure 15: Predicted probabilities of continuing to a specific professional cluster, grade retention**

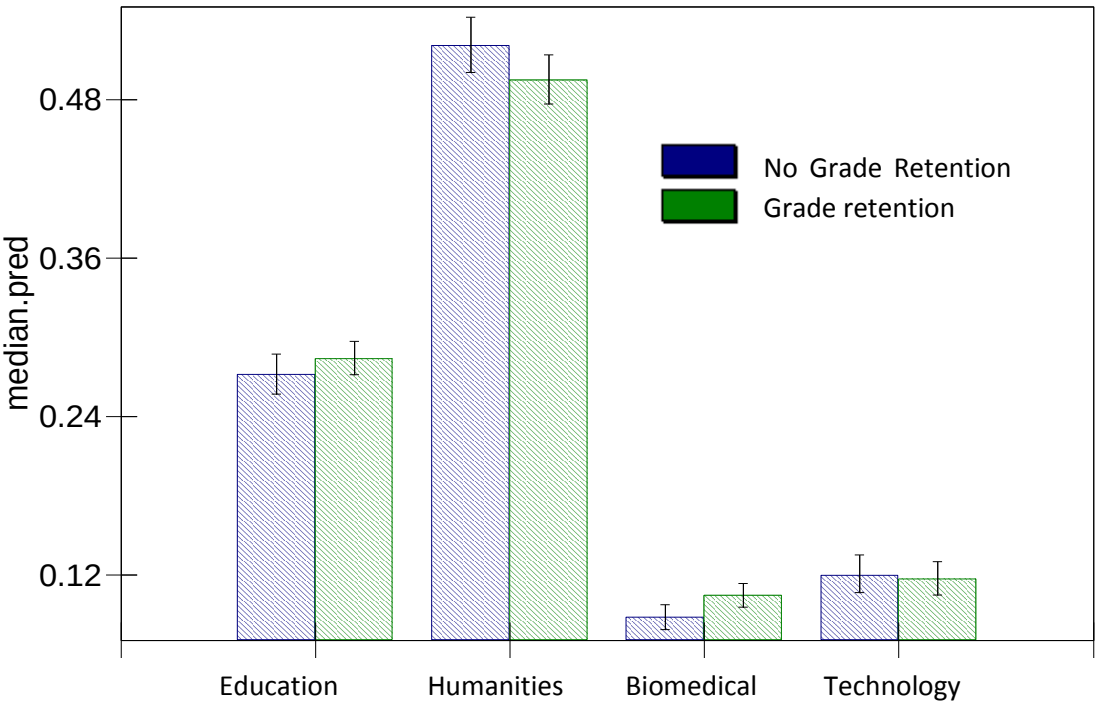
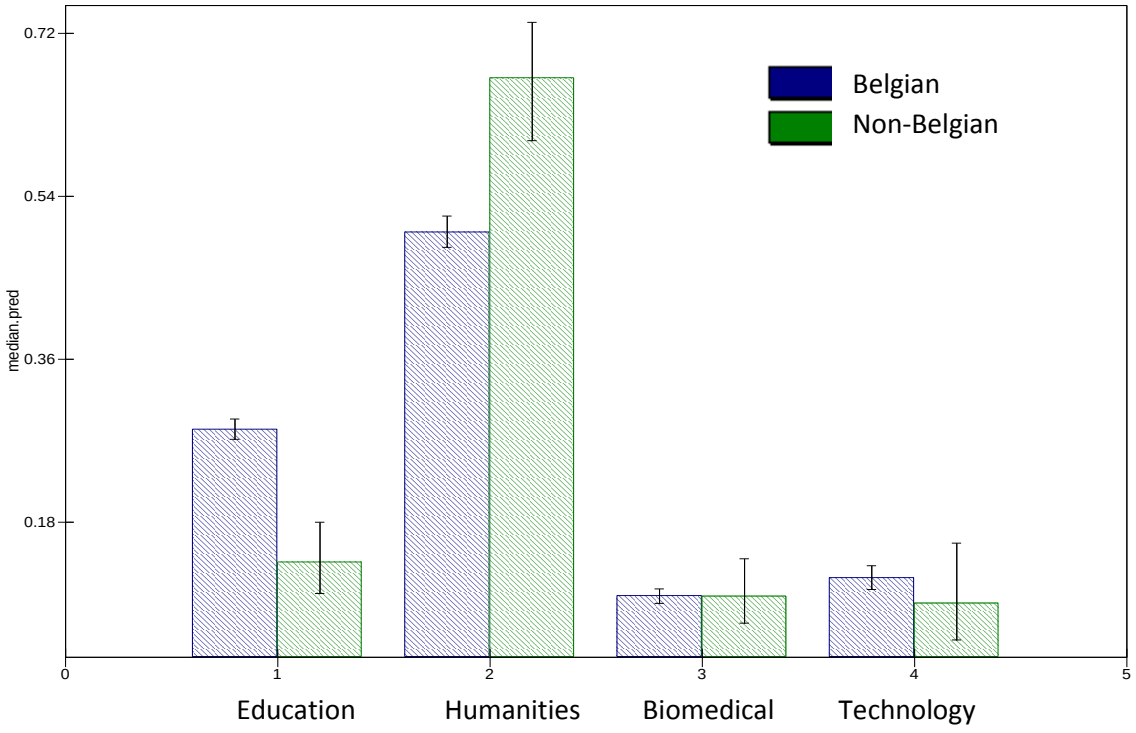



Figure 16 shows the different enrolment probabilities of both Belgian and students from other nationalities. We can see that the enrolment probability in the Education cluster is significantly lower for students with another nationality, while the opposite is true for the Humanities cluster. Nationality does not significantly influence the enrolment probabilities in the Biomedical and Technology cluster.

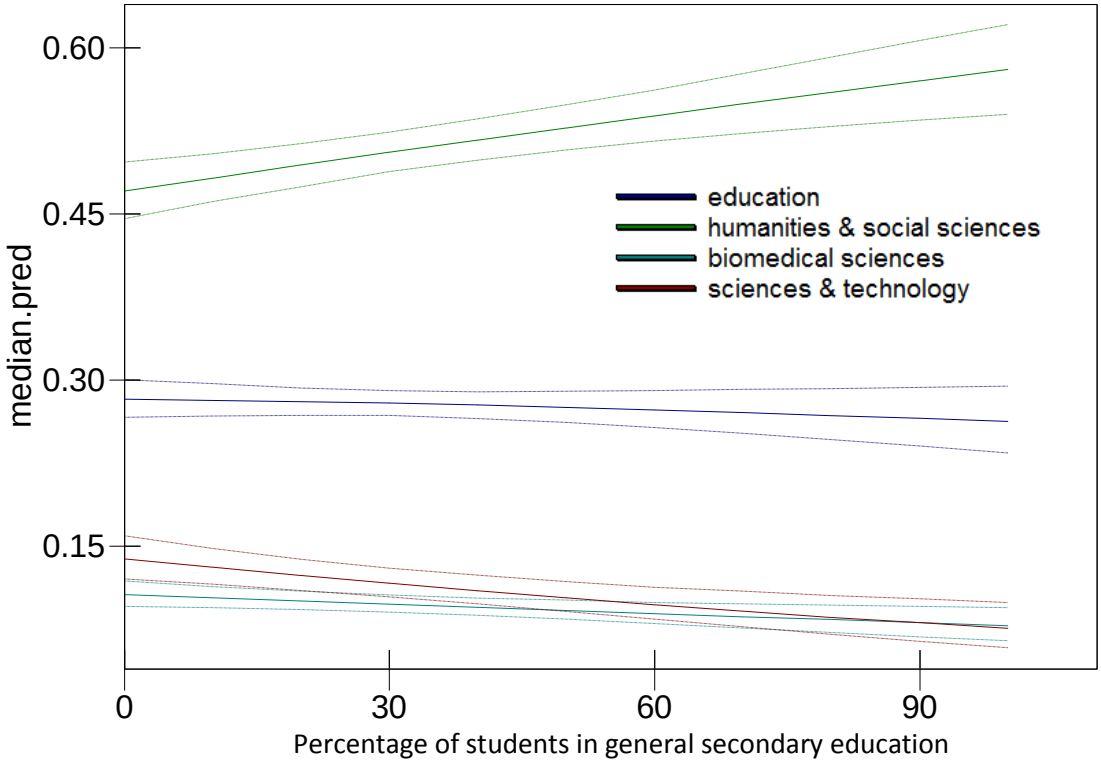
**Figure 16: Predicted probabilities of continuing to a specific professional cluster by nationality**



### 3.2.2 Interpretation of the variables at the school level

Model 7 in Table 6 showed us the enrolment probabilities of a student in the different professional clusters depend significantly on the percentage of students attending general secondary education in the secondary school he or she attended. Figure 17 visualizes these results. The probability of enrolment of the Humanities and Technology clusters depend on the percentage of general secondary students in a student's secondary school. While a student has a higher likelihood of enrolling in the Humanities cluster when he attended a secondary school with a higher level of general secondary education students, the opposite is true for the Technology cluster. The enrolment probabilities in the Education and Biomedical clusters do not seem to depend on the school composition of the student's secondary school.

**Figure 17: Predicted probabilities of continuing to a specific professional cluster by percentage of students in general secondary education**



We want to conclude this chapter by enumerating the most important findings:

(1) We found the education form profile of the Teacher Education cluster to be quite different from those of the other professional clusters. Vocational secondary education students have a far higher probability to enroll in teacher education programmes. The opposite is true for general and technical secondary education students.

(2) We also found the effects of vocational and technical secondary education to vary significantly between secondary schools and argumented this might be due to a different offer of trainings and specialisations.

(3) We did not find differences in grade retention levels between the professional clusters.

(4) The Teacher Education cluster was found to have a very feminine and Belgian character.

(5) To conclude, the percentage of general secondary education students in a secondary school was found to increase the probability of a student to enroll in the Humanities cluster, while the opposite is true for the Technology cluster. No effect of this variable on the enrolment probability in the Education and Biomedical cluster was found.

# Chapter 4: A comparison of nursery, primary and secondary teacher education

In this chapter, the inflow in the three different professional teacher education programmes is compared. As was done in the previous sections, null models are estimated to determine the multilevel structure that should be maintained throughout the analyses. Subsequently, the influence of several individual and secondary school characteristics on the enrolment probabilities in the different teacher education programmes is considered.

## 4.1 Unconditional Models

The results of the different unconditional models, which are represented by Table 9, show the multilevel structure where only secondary schools are taken into account as higher level is the preferred structure for the comparison of inflow in the three different professional teacher education programmes. This can be seen after consideration of the DIC-values. Therefore, in the next section, only the secondary school level is considered as higher level.

**Table 9: Unconditional models**

| reference category = nursery | SINGLE LEVEL | | MUNICIPALITIES | | SCHOOLS | | CROSS-CLASSIFICATION | |
|---|---|---|---|---|---|---|---|---|
| | primary Model 1a (S.E.) | secondary Model 1b (S.E.) | primary Model 2a (S.E.) | secondary Model 2b (S.E.) | primary Model 3a (S.E.) | secondary Model 3b (S.E.) | primary Model 4a (S.E.) | secondary Model 4b (S.E.) |
| **Fixed parameters** | | | | | | | | |
| ***Constant*** | 0.293(0.038)* | 0.607(0.035)* | 0.301(0.043)* | 0.621(0.039)* | 0.534(0.060)* | 0.830(0.069)* | 1.258(0.151)* | 1.423(0.163)* |
| **Random parameters** | | | | | | | | |
| *Level: residence* | | | | | | | | |
| variance | | | 0.068(0.036) | 0.034(0.023) | | | 0.111(0.071) | 0.082(0.050) |
| covariance | | | 0.039(0.025) | | | | 0.052(0.053) | |
| *Level: schools* | | | | | | | | |
| variance | | | | | 0.524(0.103)* | 1.188(0.155)* | 1.434(0.322)* | 2.179(0.370)* |
| covariance | | | | | 0.651(0.114)* | | 1.597(0.335)* | |
| **DIC** | 11211 | | 11202 | | 10670 | | 10802 | |
| **Number of students** | 5245 | | 5245 | | 5245 | | 5245 | |
| **Number of neighborhoods** | - | | 331 | | - | | 331 | |
| **Number of schools** | - | | - | | 622 | | 622 | |

## 4.2 Characteristics at the individual and school level

In this section, the influence of several individual and secondary school characteristics on the enrolment probability in a specific teacher education programme is considered. It should be mentioned that nationality is not considered in these analyses, since too few non-Belgian students enroll in a Flemish teacher education programme to include this variable in the analyses. The results of the analyses where individual factors were included can be found in Table 10. Three models, of which the results are not depicted here, were estimated to consider the influence of secondary school factors. However, none of the secondary school factors as discussed in section 1.3.3 was found to have a significant influence in explaining the enrolment probabilities in the different professional teacher education programmes. Therefore, only the models that include individual factors are shown in Table 10. Model 5 is a random intercepts model, while Model 6 is a random slopes model with a diagonal variance structure. When considering the DIC-values of both models, it can be concluded that the random intercepts model should be preferred. This means that the effects of the different individual factors do not significantly differ by secondary school.

**Table 10: Random Intercept and Slopes Model, Individual factors, nursery versus primary and secondary teacher education**

| Reference category = nursery | Random Intercepts Model | | Random Slopes Model | |
|---|---|---|---|---|
| | Primary | secondary | primary | secondary |
| | Model 5a (S.E.) | Model 5b (S.E.) | Model 6a (S.E.) | Model 6b (S.E.) |
| **Fixed parameters** | | | | |
| ***Constant*** | 3.466(0.197)* | 4.686(0.198)* | 3,148(0,183)* | 4,348(0,182)* |
| ***Individual factors*** | | | | |
| Educational form (ref. category = ASO) | | | | |
| BSO | -2.915(0.157)* | -2.639(0.164)* | -3,156(0,279)* | -2,511(0,176)* |
| TSO | -1.319(0.104)* | -1.216(0.117)* | -1,298(0,099)* | -1,180(0,114)* |
| KSO | -2.284(0.287)* | -1.148(0.267)* | -2,203(0,301)* | -1,007(0,238)* |
| Female (ref. category = male) | -2.137(0.178)* | -3.611(0.174)* | -1,92(0,166)* | -3,37(0,164)* |
| grade_retention (ref. category = no grade retention) | -0.019(0.088) | -0.150(0.093) | -0,016(0,089) | -0,131(0,094) |
| | | | | |
| **Random parameters** | | | | |
| *Level: schools* | | | | |
| Variance | 0.503(0.103)* | 0.130(0.049)* | see matrix **Table 11** | |
| Covariance | 0.175(0.065)* | | | |
| **Deviance information criterion (DIC)** | 9385 | | 9444 | |
| Number of students | 5245 | | 5245 | |
| Number of schools | 622 | | 622 | |

*p<0,05

**Table 11: Individual and school level variables, between-school variation Model 5**

| cons1 | cons2 | BSO1 | TSO1 | KSO1 | BSO2 | TSO2 | KSO2 | women1 | women2 | grade_ret_1 | grade_ret_2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0,01(0,01) | - | - | - | - | - | - | - | - | - | - | - |
| - | 0,05(0,05) | - | - | - | - | - | - | - | - | - | - |
| - | - | 1,85(0,95) | - | - | - | - | - | - | - | - | - |
| - | - | - | 0,05(0,06) | - | - | - | - | - | - | - | - |
| - | - | - | - | 0,23(0,53) | - | - | - | - | - | - | - |
| - | - | - | - | - | 0,92(0,43)* | - | - | - | - | - | - |
| - | - | - | - | - | - | 0,57(0,14)* | - | - | - | - | - |
| - | - | - | - | - | - | - | 0,04(0,06) | - | - | - | - |
| - | - | - | - | - | - | - | - | 0,01(0,02) | - | - | - |
| - | - | - | - | - | - | - | - | - | 0,05(0,06) | - | - |
| - | - | - | - | - | - | - | - | - | - | 0,02(0,03) | - |
| - | - | - | - | - | - | - | - | - | - | - | 0,13(0,12) |

1 = primary; 2 = secondary *p<0.05

### 4.2.1 Interpretation of the variables at the individual level

The results of Model 5 in Table 10 are illustrated using figures, as was done in the previous chapters. The probability of enrolment in a specific teacher education programme does clearly depend on the education form a student studied in secondary education, as can be seen in Figure 18. A vocational student who continues to a teacher education programme is very likely to opt for nursery teacher education, while the likelihood a student who was enrolled in general secondary education continues to nursery education is negligible. Considering primary and secondary teacher education programmes, it is clear that the enrolment probability of general and technical secondary education students is far higher when compared to the probability of a vocational student to enroll in these types of teacher education. The education form profile of the nursery teacher education is therefore completely different than those of primary and secondary teacher education. This is an interesting finding we would like to explore in more detail, since the general perception in Flanders is that the enrolment of vocational students in teacher education programmes is threatening the quality of our future teachers.

**Figure 18: Predicted probabilities of continuing to nursery, primary or secondary teacher education by education form**

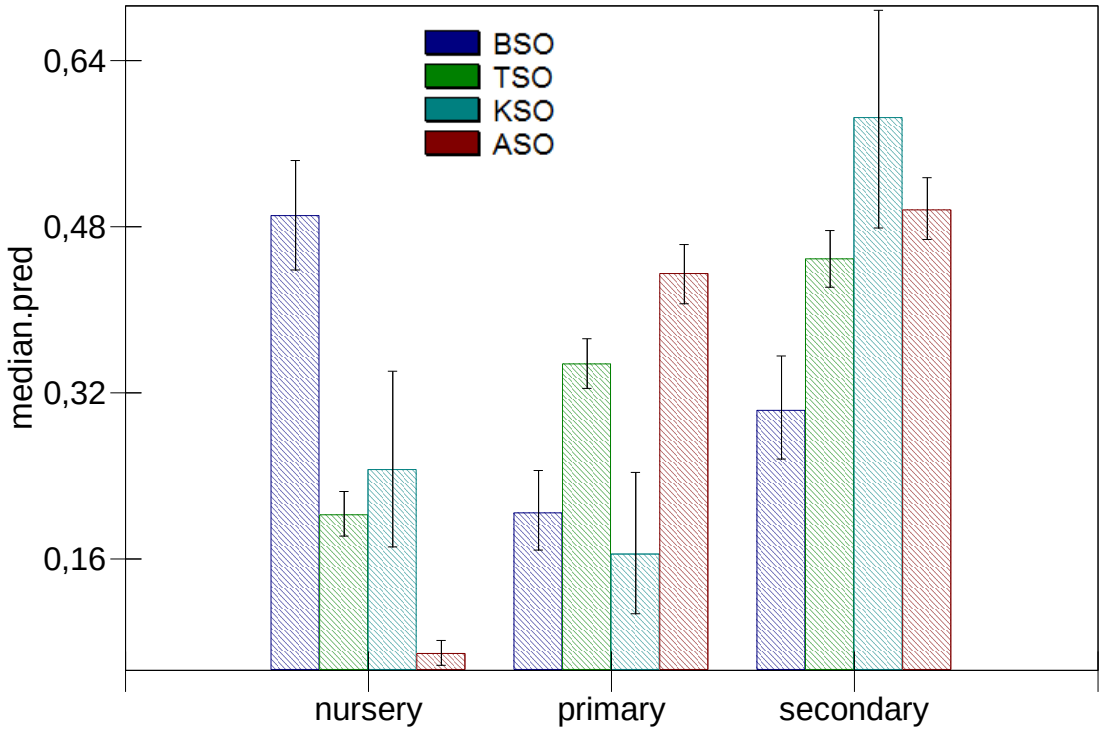


Table 12 gives us insight in the inflow of vocational students in the different professional teacher education programmes. The inflow of vocational students in the nursery and primary teacher education programmes can be considered as very homogeneous. More than 60 percent of the inflowing vocational students have frequented office administration or child care in secondary education. 46 percent of the vocational students who opt for nursery teacher education frequented child care in secondary education, while 53 percent of the vocational students who have chosen for primary teacher education come from office administration. Moreover, when the percentages of students who frequented vocational secondary education are considered, we can see the vocational character of nursery teacher education: 26 percent of all students who choose for nursery teacher education frequented vocational secondary education. The picture is completely different for primary and secondary teacher education: In these programmemes, respectively only five and seven percent of the students went to vocational secondary education. Considering the average inflow of vocational students in all professional programmes in higher education is approximately eight percent, the inflow of vocational students in the primary and secondary teacher education programmes are below average. Also, when the descriptive statistics in Appendix III are closely examined, it can be noted that the inflow of general secondary education students in primary and secondary teacher education programmes is above average when compared to all professional programmes.

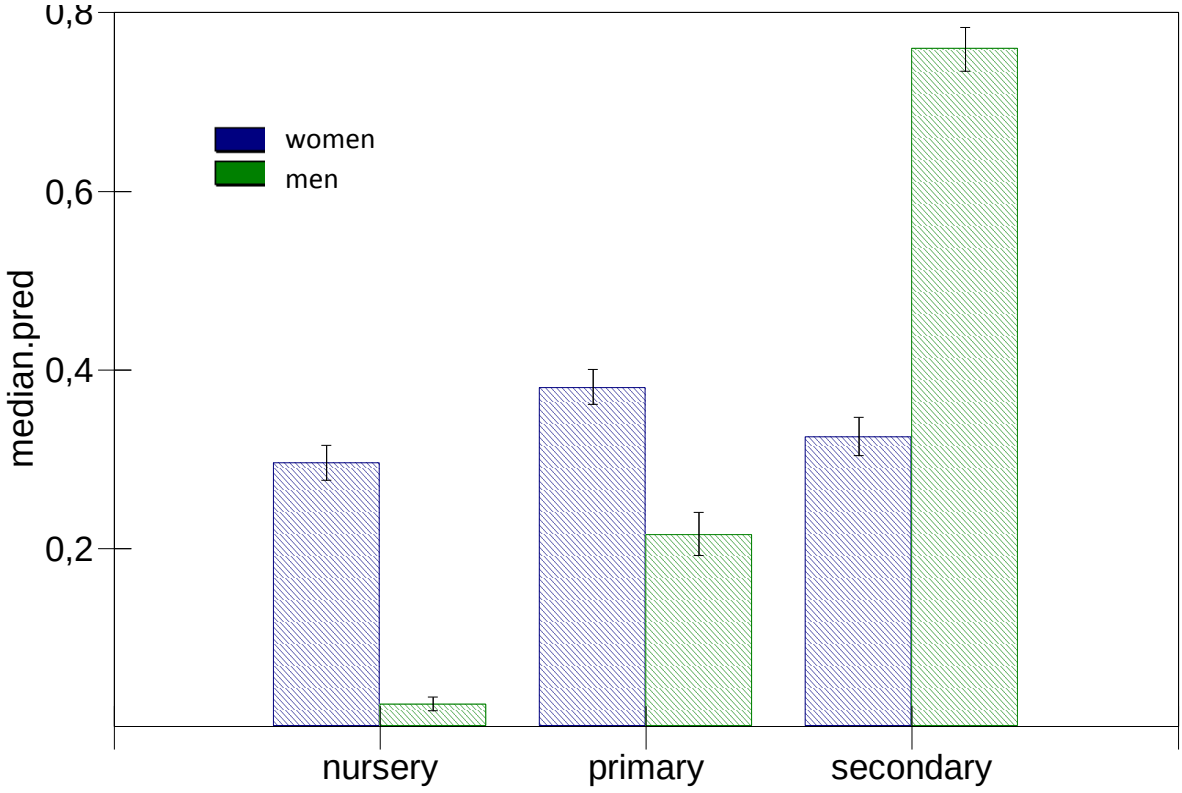
**Table 12: Specialisations in vocational secondary education according to type of teacher education programme, percentages of total vocational inflow in respective cluster**

| | | Nursery | Primary | Secondary |
|---|---|---|---|---|
| Number of students who frequented BSO | | N = 325 | N = 85 | N = 125 |
| % BSO students compared to entire inflow | | 26% | 5% | 7% |
| Type of specialisation in vocational education | Dutch name | | | |
| Administration and Data Management | Kantooradministratie en gegevensbeheer | 24% | 53% | 32% |
| Child Care | Kinderzorg | 46% | 12% | 3% |
| Unnamed Year | Naamloos leerjaar | 3% | 2% | 15% |
| Hair Stylist | Haarstilist | 4% | 2% | 10% |
| Shop Management and Window Dressing | Winkelbeheer en Etalage | 5% | 8% | 2% |
| Domiciliary and Eldery Care | Thuis-en bejaardenzorg/Zorgkundige | 3% | 6% | 1% |
| Other | Andere | 14% | 16% | 37% |

A man who opts for a professional teacher education programme in higher education has a probability of 76 percent to choose secondary teacher education (Figure 19). This has nothing to do with a possible male character of secondary teacher education,

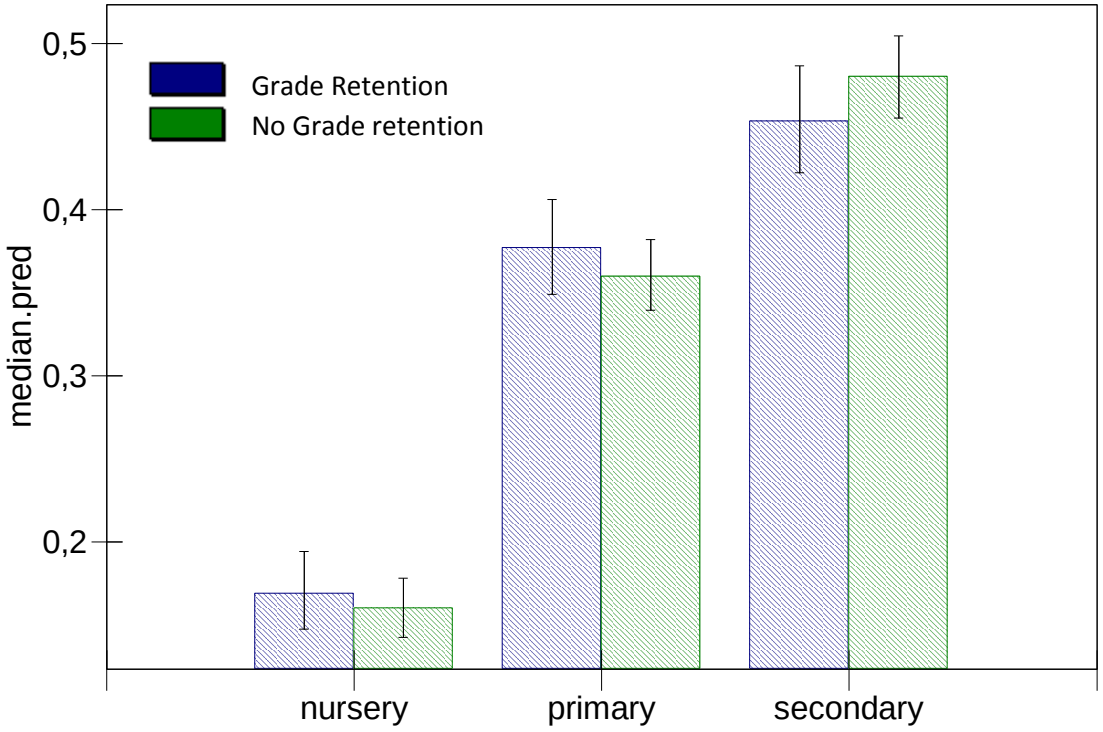
but reflects the feminine character of nursery and primary education: In secondary teacher education, 50.5 percent of the inflowing students are men, 49.5 percent are women.

**Figure 19: Predicted probabilities of continuing to nursery, primary or secondary teacher education by gender**




Students with and without grade retention do not have different probabilities of inflow in the three different types of professional teacher education programmes. This is certainly an important given considering the debate about the quality of the different teacher education programmes.

**Figure 20: Predicted probabilities of continuing to nursery, primary or secondary teacher education by grade retention**




We conclude this chapter by resuming the main findings. We found the educational form profile of nursery teacher education to be completely different than those of primary and secondary teacher education. While the vocational inflow in nursery education was found to be above average compared to all professional programmes, the opposite is true for the primary and secondary teacher education programmes. The probability of a general secondary education student to enroll in nursery teacher education is negligible, while the percentage of this type of students is above average for primary and secondary teacher education when compared to the entire inflow in professional programmes in higher education. The enrolment probabilities of men in nursery and primary teacher education were estimated to be very low. Finally, no significant differences considering grade retention have been found between the different types of teacher education programmes.

# Chapter 5: Discussion & Conclusions

The aim of this report was to gain more in-depth knowledge in the inflow in professional teacher education programmes in Flanders by comparing the inflow of different levels of higher education. In this chapter, we will summarize the findings and formulate their implications.

## 5.1 Academic versus Professional programmes

We assumed the first decision when continuing to higher education is the choice between an academic and professional programme. The multilevel analyses indicated that not only individual indicators should be taken into account when considering this choice, but that the secondary school a student was enrolled in highly influences this decision as well. The place of residence and its characteristics were not found to have a significant influence on the choice between academic or professional programmes.

On the individual level, the analyses confirmed that the probability of continuing to an academic rather than a professional programme is higher when a student frequented general secondary education, did pass every year, is male and does not have the Belgian nationality. Considering the school level, the importance of secondary schools on the educational career in higher education in Flanders has so far been given little to no attention. Research has however confirmed that secondary schools have a major influence on achievement outcomes in secondary education (Opdenakker and Van Damme 2001; De Fraine, Van Damme et al. 2003; Opdenakker and Van Damme 2007). This report found that a higher percentage of technical and vocational students in a secondary school decreases the probability a student will continue to an academic programme, regardless of the education form, gender, grade retention level and nationality this student has. A higher percentage of equal opportunities students in a school, on the other hand, increases the likelihood a student will continue to an academic programme. These findings provide some evidence for the existence of a peer group effect in Flanders: A student will compare his or her achievement, possibilities and position with those of others in his or her social context when making educational choices. Minor differences between enrolment probabilities between educational networks were found. However, we believe this is due to the fact that we could not entirely control for the different student profiles in the

educational networks (Creten, Douterlunge et al. 2000). We could for example not control for the different educational levels of the parents in the educational networks. Further research is necessary to gain more insight in the influence of the secondary school context on the educational choices a student makes.

## 5.2 A comparison of four professional bachelor clusters

We compared the students' profiles of teacher education with three other professional clusters, namely a Humanities, a Biomedical and a Technology cluster. The inflow probability of vocational students in the Education cluster was found to be particularly high compared to the other clusters. This is however solely due to the high enrolment probability of vocational students in nursery teacher education.

Students who enrol in teacher education programmes have a similar profile when considering levels of grade retention, taking into account education forms and other control variables. In this regard, the inflow of students in teacher education cannot be considered as weaker than the other professional programmes in higher education in Flanders. Very few students who do not have the Belgian nationality enrol in teacher education. The feminine character of teacher education is also confirmed in the analyses.

Secondary schools are found to significantly influence the choice between one of the four professional bachelor clusters. An increasing percentage of general secondary education students increases the likelihood of opting for the Humanities cluster, while the opposite is true for the Technology cluster. This variable did however not influence the likelihood of opting for the Education and Biomedical cluster. The importance of this variable seems however very limited, as the unexplained variance at the school level did not decrease substantially.

The differences between secondary schools' enrolment probabilities in the different clusters can largely be explained by allowing the individual effects of the education forms to vary across schools (random slopes model), indicating the effect of the education forms on the probability of enrolment in the different professional clusters does significantly differ between secondary schools. We stated the argument that this is possibly due to different offers of specialisations and trainings in secondary schools. We found for example that for every cluster more than 50 percent of the inflow of vocational students can be attributed to five specialisations. If a secondary school does not offer some of the

specialisations that often lead to the transition to a specific cluster, very few students of this secondary school will make this type of transition.

## 5.3 A comparison of nursery, primary and secondary teacher education.

The general perception of the inflow in teacher education in Flanders is that too many vocational students enrol in teacher education programmes, leading to a decrease in the quality of our future teachers. We have, however, only found a high inflow – 26 percent of total inflow- of vocational students in nursery teacher education. 46 percent of these vocational students who enrol in nursery teacher education frequented Child Care in the specialisation year in secondary education. This fact should give cause for debate. Because what is a qualified nursery school teacher? What is the reason for existence of a specialisation such as Child Care if the students who enroll in this specialisation are not considered as potential qualified future nursery school teachers? We think the debate about our future teachers should be about what we think a qualified teacher is, instead of focusing on which education form the inflowing students frequented in secondary education.

We have found the inflow of vocational students in primary and secondary teacher education programmes to be below average when compared to all professional programmes, while the inflow of general secondary education students is above average. Another remarkable finding was that 53 percent of the inflowing vocational students in primary teacher education completed an Administration and Data Management specialisation in secondary education. In the nursery and secondary teacher education programme the inflow of students who completed this specialisation was high as well (respectively 24 and 32% of the vocational inflow). The reasons for the popularity of teacher education programmes after this specialisation are unclear and can be the subject of future research.

As would be expected, men are much more likely to opt for secondary teacher education than for nursery or primary teacher education. Grade retention was not found to influence the likelihood of opting for a specific teacher education programme.

## 5.4 Limitations & Further Research

Several limitations should be mentioned considering this report. Firstly, we were not able to include family background characteristics since no such data were available. These characteristics are however often found to be very important when considering educational choices and outcomes. Also, these family background characteristics are likely to be correlated with indicators such as education form and nationality. This might lead to some under- or overestimation of the importance of these variables. A second limitation is that we used grade retention as an indicator of ability. While this is useful, it would have been better if we would have been able to control for ability based on ability test scores. Thirdly, as we already mentioned when considering the effect of the educational networks, it is possible we were not able to entirely eliminate the selection bias considering the non-random inflow in the secondary schools.

In this report, we only considered the first registration in higher education of a cohort of students who graduated from secondary education in 2004-2005. This is interesting because in this way we could compare the differences in educational choices this cohort made. However, we did not capture the entire inflow in teacher education programmes since other persons could have enrolled apart from this cohort. For example, students who have chosen earlier for another programme but change to teacher education are not considered in this report. We will consider the entire educational careers of the cohort we investigated in a next report, where we will consider the changes in educational choices students make after their first year in higher education.

While we allowed the first enrolment to be in the entire period 2005-2011, the majority of the students considered in our analyses enrolled immediately after secondary education, namely in september 2005. Five percent of all students who continued to higher education did however not enroll in higher education immediately after graduation. We considered the possibility of time effects in additional sensitivity analyses where an indicator variable for later enrolment was included. These analyses did not lead to different results than those mentioned in the report.

Since previous reports (Huyge, Siongers et al. 2009) raised concern about rising levels of vocational and decreasing levels of general secondary education students, it would be interesting to repeat the previous analyses with a longitudinal dataset, considering different cohorts of graduates of secondary education. In this way, the

evolution of the inflow of different education forms when comparing different educational choices can be considered. The question remains whether the evolution of an increasing number of vocational students in teacher education programmes is a phenomenon that is typical to these programmes or a phenomenon of higher education in general. If the latter is proven to be true, the debate should maybe be about the quality of the inflow in higher education in general, rather than focused on teacher education programmes.

Finally, we would like to stress that, while it is relevant to investigate the inflow profiles of students in higher education, the quality perception of our future teachers cannot be solely based on the investigation of the inflow. An extensive investigation of the outflow of the different professional teacher education programmes is necessary. If a vocational student enrolled in nursery teacher education meets the conditions to obtain his or her degree, we believe it should be assumed this means this student is a qualified nursery education teacher. A decreasing quality of inflowing students might however, as mentioned in the report of Huyghe, Siongers et al. (2009), lead to a perception of teacher education programmes as easy and a solution for those who have failed elsewhere.

# APPENDICES

# Appendix I: Coding of the clusters

**Table I: Recoding of fields of study into four clusters**

| Cluster field of study: | Recoded into: |
|---|---|
| Bewegings- en revalidatiewetenschappen | Biomedical Science |
| Biomedische wetenschappen | Biomedical Science |
| Diergeneeskunde | Biomedical Science |
| Farmaceutische wetenschappen | Biomedical Science |
| Geneeskunde | Biomedical Science |
| Gezondheidszorg | Biomedical Science |
| Tandheelkunde | Biomedical Science |
| Onderwijs | Education |
| Archeologie en kunstwetenschappen | Humanities, Social Sciences & Art |
| Audiovisuele en beeldende kunst | Humanities, Social Sciences & Art |
| Economische en toeg.economische wetens. | Humanities, Social Sciences & Art |
| Economische en toeg.economische wetens. - Politieke en sociale wetenschappen | Humanities, Social Sciences & Art |
| Geschiedenis | Humanities, Social Sciences & Art |
| Geschiedenis - Taal- en letterkunde | Humanities, Social Sciences & Art |
| Godgeleerdheid, godsdienstw. en kerk.rec | Humanities, Social Sciences & Art |
| Handelswetenschappen en bedrijfskunde | Humanities, Social Sciences & Art |
| Muziek en podiumkunsten | Humanities, Social Sciences & Art |
| Politieke en sociale wetenschappen | Humanities, Social Sciences & Art |
| Psychologie en pedagogische wetens. | Humanities, Social Sciences & Art |
| Rechten, notariaat en crimin. wetensch. | Humanities, Social Sciences & Art |
| Sociaal-agogisch werk | Humanities, Social Sciences & Art |
| Sociale gezondheidswetenschappen | Humanities, Social Sciences & Art |
| Taal- en letterkunde | Humanities, Social Sciences & Art |
| Toegepaste taalkunde | Humanities, Social Sciences & Art |
| Wijsbegeerte en moraalwetenschappen | Humanities, Social Sciences & Art |
| Architectuur | Science, Engineering & Technology |
| Biotechniek | Science, Engineering & Technology |
| Industriële wetenschappen en technologie | Science, Engineering & Technology |
| Nautische wetenschappen | Science, Engineering & Technology |
| Productontwikkeling | Science, Engineering & Technology |
| Toegepaste biologische wetenschappen | Science, Engineering & Technology |
| Toegepaste wetenschappen | Science, Engineering & Technology |
| Verkeerskunde | Science, Engineering & Technology |
| Wetenschappen | Science, Engineering & Technology |

# Appendix II: Preliminary Analyses

**Table II.A: Preliminary Analyses, PBA Teacher Education compared to other clusters, single level**

| | PROFESSIONAL PROGRAMMES | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Reference category: PBA Teacher Education** | **PBA Humanities** | | | **PBA Biomedical** | | | **PBA Technology** | | |
| | **B** | **Std. Error** | **Sig.** | **B** | **Std. Error** | **Sig.** | **B** | **Std. Error** | **Sig.** |
| **Intercept** | 0,11 | 0,12 | 0,37 | -0,58 | 0,17 | 0,00 | -0,74 | 0,15 | 0,00 |
| ***Individual factors*** | | | | | | | | | |
| **man (ref. = woman)** | 0,62 | 0,04 | 0,00 | -0,97 | 0,07 | 0,00 | 2,26 | 0,05 | 0,00 |
| **educational form (ref. = TSO)** | | | | | | | | | |
| **ASO** | 0,12 | 0,06 | 0,05 | 0,05 | 0,09 | 0,56 | 0,05 | 0,09 | 0,58 |
| **BSO** | -0,46 | 0,07 | 0,00 | -0,42 | 0,09 | 0,00 | -0,88 | 0,09 | 0,00 |
| **KSO** | -0,73 | 0,14 | 0,00 | -1,77 | 0,28 | 0,00 | 0,81 | 0,14 | 0,00 |
| **No grade retention (ref. = grade retention)** | -0,12 | 0,04 | 0,00 | 0,05 | 0,06 | 0,41 | -0,02 | 0,05 | 0,72 |
| ***school factors*** | | | | | | | | | |
| **Educational network (ref. = VGO)** | | | | | | | | | |
| **GO!** | -0,07 | 0,08 | 0,41 | 0,04 | 0,12 | 0,73 | -0,48 | 0,10 | 0,00 |
| **OGO** | 0,30 | 0,08 | 0,00 | 0,37 | 0,12 | 0,00 | -0,15 | 0,08 | 0,08 |
| **percentage_ASO** | 0,00 | 0,00 | 0,08 | 0,00 | 0,00 | 0,04 | -0,02 | 0,00 | 0,00 |
| **percentage_BSO** | 0,00 | 0,00 | 0,00 | 0,01 | 0,00 | 0,00 | 0,01 | 0,00 | 0,00 |
| **percentage_TSO** | 0,00 | 0,00 | 0,01 | -0,01 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 |
| **proportion_indicator_23** | 2,05 | 0,24 | 0,00 | 0,09 | 0,35 | 0,81 | -2,61 | 0,31 | 0,00 |

**Table II.B: Preliminary Analyses, PBA Teacher Education compared to other clusters, single level**

| | ACADEMIC PROGRAMMES | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Reference category: PBA Teacher Education | ABA Humanities | | | ABA Biomedical | | | ABA Technology | | |
| | B | Std. Error | Sig. | B | Std. Error | Sig. | B | Std. Error | Sig. |
| Intercept | -1,61 | 0,14 | 0,00 | -3,30 | 0,22 | 0,00 | -2,50 | 0,16 | 0,00 |
| *Individual factors* | | | | | | | | | |
| man (ref. = woman) | 0,91 | 0,04 | 0,00 | 0,75 | 0,06 | 0,00 | 2,19 | 0,05 | 0,00 |
| educational form (ref. = TSO) | | | | | | | | | |
| ASO | 2,75 | 0,07 | 0,00 | 2,76 | 0,12 | 0,00 | 2,00 | 0,09 | 0,00 |
| BSO | -0,20 | 0,11 | 0,07 | -2,10 | 0,59 | 0,00 | -2,24 | 0,29 | 0,00 |
| KSO | 2,25 | 0,12 | 0,00 | -1,19 | 0,60 | 0,05 | 1,45 | 0,16 | 0,00 |
| No grade retention (ref. = grade retention) | 0,27 | 0,05 | 0,00 | 0,88 | 0,09 | 0,00 | 0,79 | 0,06 | 0,00 |
| *School factors* | | | | | | | | | |
| Educational network (ref. = VGO) | | | | | | | | | |
| GO! | -0,26 | 0,09 | 0,01 | -0,68 | 0,15 | 0,00 | -0,52 | 0,11 | 0,00 |
| OGO | 0,25 | 0,09 | 0,00 | -0,12 | 0,14 | 0,40 | -0,11 | 0,10 | 0,30 |
| percentage_ASO | 0,00 | 0,00 | 0,08 | 0,00 | 0,00 | 0,64 | 0,00 | 0,00 | 0,00 |
| percentage_BSO | -0,01 | 0,00 | 0,00 | -0,01 | 0,00 | 0,00 | 0,01 | 0,00 | 0,02 |
| percentage_TSO | -0,01 | 0,00 | 0,00 | -0,01 | 0,00 | 0,00 | -0,01 | 0,00 | 0,00 |
| proportion_indicator_23 | 2,59 | 0,31 | 0,00 | 2,35 | 0,59 | 0,00 | -1,24 | 0,41 | 0,00 |
| | Negative and significant coefficient | | | coefficient not significant | | | positive and significant coefficient | | |

PBA = professional bachelor
ABA = academic bachelor

# Appendix III: Descriptive Statistics

## B3.1 Academic versus Professional Programmes

**Table III: Descriptive statistics individual factors, academic versus professional programmes**

| | Professional Bachelor Programmes N = 21.520 | Academic Bachelor Programmes N = 17.473 | All Higher Education Programmes N = 38.993 |
|---|---|---|---|
| Gender (%) | | | |
| Women | 56,9% | 51,4% | 54,5% |
| Men | 43,1% | 48,6% | 45,5% |
| Educational Form (%) | | | |
| ASO | 33,6% | 86,0% | 57,1% |
| BSO | 7,8% | 0,8% | 4,7% |
| KSO | 2,1% | 3,5% | 2,7% |
| TSO | 56,4% | 9,6% | 35,4% |
| Grade Retention (%) | | | |
| At least 1 year of Grade Retention | 33,7% | 15,0% | 25,3% |
| No Grade Retention | 66,3% | 85,0% | 74,7% |
| Nationality (%) | | | |
| Belgian | 98,3% | 98,2% | 98,2% |
| Other | 1,7% | 1,8% | 1,8% |

## B3.2 Comparison of four different professional clusters

**Table IV: Descriptive statistics individual factors, comparison of four different professional clusters**

| | PBA Teacher Education N = 5.245 | PBA Humanities, Social Sc. & Arts N = 9.609 | PBA Biomedical Sciences N = 2.686 | PBA Science, Engin. & Technology N = 3.980 | All PBA Programmes N = 21.520 |
|---|---|---|---|---|---|
| Gender (%) | | | | | |
| Women | 70,8% | 56,7% | 86,5% | 19,3% | 56,9% |
| Men | 29,2% | 43,3% | 13,5% | 80,7% | 43,1% |
| Educational Form (%) | | | | | |
| ASO | 34,5% | 38,3% | 38,4% | 18,2% | 33,6% |
| BSO | 10,8% | 7,0% | 8,5% | 5,5% | 7,8% |
| KSO | 2,7% | 1,3% | 0,6% | 4,6% | 2,1% |
| TSO | 52,0% | 53,5% | 52,5% | 71,8% | 56,4% |
| Grade Retention (%) | | | | | |
| At least 1 year of Grade Retention | 31,5% | 35,0% | 26,7% | 38,3% | 33,7% |
| No Grade Retention | 68,5% | 65,0% | 73,3% | 61,7% | 66,3% |
| Nationality (%) | | | | | |
| Belgian | 99,1% | 97,6% | 98,4% | 98,9% | 98,3% |
| Other | 0,9% | 2,4% | 1,6% | 1,1% | 1,7% |

## B3.3 Nursery, primary and secondary teacher education programmes

**Table V: Descriptive statistics individual factors, nursery, primary & secondary teacher education programmes**

| | Nursery Teacher Education N = 1.255 | Primary Teacher Education N = 1.685 | Secondary Teacher Education N = 2.305 | All Teacher Education Programmes N = 5.245 |
|---|---|---|---|---|
| **Gender (%)** | | | | |
| Women | 96,7% | 80,8% | 49,5% | 70,8% |
| Men | 3,3% | 19,2% | 50,5% | 29,2% |
| **Education Form (%)** | | | | |
| ASO | 15,1% | 45,2% | 37,1% | 34,5% |
| BSO | 25,9% | 5,0% | 6,9% | 10,8% |
| KSO | 4,1% | 1,3% | 2,9% | 2,7% |
| TSO | 54,8% | 48,4% | 53,1% | 52,0% |
| **Grade Retention (%)** | | | | |
| At least 1 year of Grade Retention | 32,7% | 25,7% | 35,1% | 31,5% |
| No Grade Retention | 67,3% | 74,3% | 64,9% | 68,5% |
| **Nationality (%)** | | | | |
| Belgian | 98,7% | 99,3% | 99,1% | 99,1% |
| Other | 1,3% | 0,7% | 0,9% | 1,0% |

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